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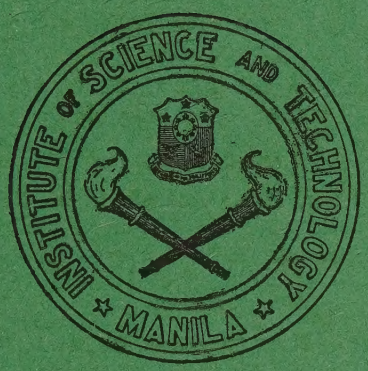

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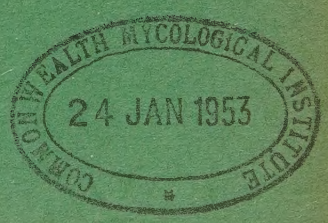

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A REVISION OF DENDROCHILUM SECTION ACORIDIUM

By LOUIS O. WILLIAMS
Escuela Agrícola Panamericana, Honduras

The genus *Dendrochilum*, section *Acoridium* had received no revisionary treatment since the time that it has been treated, first by Pfitzer and then by Ames, as a subcategory of *Dendrochilum*. The species had been brought together as *Acoridium*, by Ames for Merrill's Enumeration of Philippine Flowering Plants.

The section is a most fascinating one morphologically but identifications of the species must be carefully made. It is not wise or often even possible to identify specimens without first making careful dissections.

A few comments concerning the methods followed in this revision should be made.

1. The measurements of the leaves given always include the petiole; the shape given is of course that of the blade.

2. Leaves from a flowering pseudobulb are often much smaller than when mature; the inflorescence matures before the leaves do.

3. Measurements of all flower parts are given for the organ spread out to its full extent. This is especially important in making dissections of the lip which, as explained elsewhere, is concave or saccate and unless it is flattened out as much as possible different results are obtained. In this connection particular care should be taken when the comparative lengths of the middle and the lateral lobes of the lip are needed. This

Since that date the enumeration of the Orchidaceæ of the Philippines by Ames in Merrill's Enumeration of Philippine Flowering Plants has been the only work of consequence concerning the section *Acoridium*.

During the course of the preparation of this revision, which was to have been a revision of *Acoridium* as a genus, I began to doubt more and more the validity of the group as a distinct genus. A detailed comparative study of the many species of *Acoridium* and of all of the species of *Dendrochilum* of the Philippine flora has convinced me that there are no characters by which *Acoridium* justifiably may be kept as a separate and distinct genus.

The single character which has been relied upon to distinguish *Acoridium* from *Dendrochilum* has been the lack of stelidiar arms on the column of *Acoridium* and their presence on the column of *Dendrochilum*. It is now quite apparent that this single character is not of generic worth. Other characters ascribed to *Acoridium*, four rigidly attached saccate or concave lips and a prominent rostellum, do not belong only to the section nor are they always found in species of the section.

Acoridium merrillii (*Dendrochilum merrillii*) is a *Dendrochilum* (even section *Platyclinis*) in all respects except that it lacks stelidia. It is included in this revision more for convenience than any other reason. *Acoridium hastatum* (*Dendrochilum hastatum* Ames) has reduced stelidia yet is an *Acoridium* in other respects. *Dendrochilum rotundilabium* L. Wms. is section *Acoridium* in all respects except that the column bears stelidia or at least the thin wings on the column bear terminal lobes.

MORPHOLOGY

Habit.—The species of *Dendrochilum* section *Acoridium* are all epiphytic, perennial herbs. They generally occur in large clumps, rarely singly. All of the species are pseudobulb bearing; from the summit of the pseudobulb is borne a single leaf. In all but two known species the inflorescence is terminal and begins to appear at about the same time that the leaves do. The inflorescences have usually withered by the time that the leaves are mature. During the period over which the inflorescence lasts it may either be exceeded by or exceed the leaves.

Leaves.—The leaves present considerable variation in the section and give good supporting characters for specific distinction. Certain of the species can be grouped together by their leaf characters. Fortunately these characters can be correlated

with characters of the flowers. The venation of the leaves seems to be rather constant for any given species. There are veins of two categories in the leaves; usually three or more large prominent one and a various number of smaller ones, which in some leaves are not easily seen; only the prominent veins are used in this revision. In most species the lateral pair of prominent veins is not on the margin of the leaf but a few species may be recognized by the marginal lateral veins in the leaf.

The shape of the leaf within the section presents essentially two forms: The first which are linear, grass or sedge-like and very much longer than broad. In the species with this type of leaf the flowering peduncle is either adherent to the upper surface of the leaf or enfolded by the leaf. The second type of leaf-shape includes all of the rest of the species. In these the leaf is usually a variation of some lance-shaped form and compared in length are always much shorter than in those species with linear leaves. It is important to note in this last category that the peduncle is free from the leaf and is never enclosed by it, except in some cases where the leaf is still very young and has not opened out. This last character is of importance to notice because the leaves of some of the species of this latter group must be described as linear in shape (*D. exile, D. parvulum, D. vanoverberghii,* etc.) although the distinction between such members of this group can be easily made from species of the first group on comparison.

The leaves in section *Acoridium* are convolutive in vernation.

Inflorescence.—The inflorescence in section *Acordium* is a distichous raceme. In some species it is long and contains a multitude of flowers, in others it is short and few flowered. The raceme may be either lax or dense. These characters seem to be quite constant for the species.

In most species the inflorescence is terminal but in two known species it is lateral (*D. pulcherrimum, D. longilobum*).

The bracts of the inflorescence are fairly constant in size and shape for each species, but they offer little of taxonomic value.

Perianth.—Sepals and petals: The characters to be found in the sepals and the petals are of very real importance in the taxonomy of section *Acoridium.* The size, shape and (after a fair knowledge of the genus is formed) the texture are all of importance. The species in this revision have been largely placed in groups of species by the characters of the length and shape of these perianth parts. Fortunately these characters

seem to be stable within reasonable limits. Because of the small size of the flowers in the genus a small difference in the width and length of sepals and petals does much to change the aspect of the plant.

The lip.—In section *Acoridium*, as in other groups of orchids, the morphology of the lip is most important in distinguishing the species.

The common form of the lip in section *Acoridium* is E-shaped, that is the lip is definitely three-lobed with the lateral lobes arcuate. This shape however is not distinctive for there are several species in which the lip is simple. The author is inclined to place less phylogenetic emphasis on the structure of the lip than has formerly been done. He is of the opinion that the E-shaped lip has been developed at several points within the genus and that on the whole this shape tends to be a derived character. The oblong simple lip is thought to be more primitive than the E-shaped lip.

In most of the species of the section the lip is rigidly attached to the column.

The lip in most species is concave, particularly at a point directly under the column, or in a few species it is decidedly saccate. Rudolph Schlechter at one time considered the advisability of erecting a new genus to contain *D. saccolabium*, mainly because of the strongly saccate lip. This development in that species is, it is felt, merely the climax of a tendency. *Dendrochilum wenzelii*, a very closely allied species, has the lip nearly as saccate as *D. saccolabium* and plants apparently closely allied to both of the above species, but because of poor material not described in this paper, seem to have a less well developed sac. Attention should also be directed to *D. simulacrum*, a species with a very saccate lip but not closely allied to the above mentioned species.

Column.—The column itself is always small and because of its small size is difficult to study. It is always without lateral stelidia. In one species, *D. hastatum*, which is somewhat of an anomaly, there is an apical arm which is well developed laterally.

There is a single anther and four pollinia.

The rostellum is prominent and rather large.

Indument.—All known species of the genus are completely glabrous.

DISTRIBUTION

The section *Acoridium*, so far as it is known at the present time, is confined to the Philippines.

The majority of species of section *Acoridium* come from the island of Luzon and in most cases are rather restricted in their known distribution. Whether or not this restricted distribution is more apparent than real awaits still further exploration in the Islands. It is almost certain that the known ranges of some species will be extended and are being extended as new collections come in.

The best known localities, as far as this section is concerned, are the Mountain Province and the region around Laguna Bay in the provinces of Laguna, Rizal and adjacent Quezon (Tayabas). This is due, in part, no doubt to the fact that these two areas have been more extensively collected than other similar regions which are to be found in the Philippines.

Mt. Halcon in Mindoro has been ascended to the summit but once, yet, several species are known only from that expedition. That mountain is the only one on the Island of Mindoro which has been collected. Further inland is another high mountain which undoubtedly will have species of the section on it. Even Halcon itself should yield more species under further collecting.

In the Mountain Province there are thirty-two species known within a relatively small area and one or two more in the northern part of the province.

In the region around Laguna Bay there are twenty-five species known and these again from a rather limited area.

On the large Island of Mindanao there are but four species known at the present time (not including a probable new one, the material of which is not good enough for description), but of these only one is known only to Mindanao.

Among so many species of very local distribution it is interesting to note that there are a few species of rather wide range in the Islands. *Dendrochilum tenellum* extends from northern Leyte to Camiguin Island in the Babuyanes group; *D. wenzelii* extends from northern Leyte to northern Luzon but the localities from which it is known are rather few. *Dendrochilum microchilum* is probably the most interesting in its distribution, extending from northern Luzon to southern Mindanao, occurring at an intermediate station in Leyte. It is possibly distributed down the eastern part of the Islands between the two terminal stations, a distribution not uncommon in Philippine

plants. The plant also occurs on Negros Island, the only known species of the section *Acoridium* on that Island. Its occurrence there is not easily explained on the basis of available material and scanty knowledge of distribution of the species.

Dendrochilum rhombophorum is also of interest in its distribution. Formerly it has been known only from the region around Laguna Bay and in Bataan Province. We now have it from Surigao Province in Mindanao. There are no intermediate stations known at the present time.

The high altitude distribution of the species of this section is of interest when taken in conjunction with the localization of these plants.

Study material.—This revision is based on the excellent collection of section *Acoridium* in the Ames Herbarium, Harvard University, Cambridge, Massachusetts, specimens of the greater part of the collections that have ever been made, are to be found in that herbarium. Types or duplicate types of all but a few of the known species are also to be found here, of the few not contained in this herbarium flowers, sketches and photographs were at hand except for *Acoridium maleolens,* which is as yet an unknown quantity. All specimens cited are in the Ames Herbarium unless otherwise noted.

This revision was written while the author was Research Associate at the Botanical Museum, Harvard University, Cambridge, Mass. Especial thanks are due to the late Prof. Oakes Ames who suggested that the group needed revision and who was most liberal with his knowledge concerning the group.

TAXONOMY

Dendrochilum § *Acoridium* (Nees and Meyen) AMES, Orch. [2 (1908) 78], 3 (1908) 5.

Dendrochilum subg. *Platyclinis* (Benth.) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 104, as to *Dendrochilum cinnabarinum* only.

Acoridium NEES and MEYEN, Nov. Acta Nat. Cur. 19 Suppl. 1 (1843); ROLFE, Orch. Rev. 12 (1904) 219–220; AMES, Orch. 1 (1905) 1–6, *t. 1:* AMES, Biol. Soc. Wash. Proc. 19 (1906) 143–153, Orch. 7 (1922) 80–82; MERRILL, Enum. Philip. Fl. Pl. 1 (1924) 284–292.

Acoridium § *Euacoridium* AMES, Biol. Soc. Wash. Proc. 19 (1906) 143.

Dendrochilum subg. *Acoridium* (Nees and Meyen) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 111.

Sepals and petals free, spreading, subequal in size or either cycle larger. Labellum concave to saccate (rarely nearly plain), rigidly attached to the column except in *Dendrochilum merrillii,* always shorter than the sepals and petals, entire or

three lobed, the lateral lobes, if present, spreading or usually arcuate, usually with three calluses or sometimes apparently none. Column short, without lateral stelidia or wings of any sort, rarely with a terminal wing. Anther small, 2-celled. Pollinia 4, waxy. Subcaespitose ephiphytes with elongated to rounded unifoliate pseudobulbs and terminal, rarely lateral, inflorenscences.

Key to the species

1. Inflorescence lateral on the pseudobulbs, not subtended by a leaf nor the peduncle fused to or enclosed by the leaf.
   2. Lateral sepals oblong elliptic, obtuse, about 4 mm long. 24. *D. pulcherrimum.*
   2. Lateral sepals lanceolate, acute, 3.5 to 3.7 mm long. 25. *D. smithianum.*
1. Inflorescence terminal on the pseudobulbs, subtended by the single leaf, sometimes (species 1–10) the peduncle adherent to or fusing with the surface of the leaf or enclosed by the enrolled leaf.
   2. Base of the leaf not abruptly attenuated into a distinct petiole; leaves grass or sedge-like, more than 20 times longer than broad; pedicel adherent to or fused with the upper surface of the leaf.
      3. Labellum distinctly saccate or spurred.
         4. Lateral sepals ovate; leaves up to 10 mm broad. 10. *D. saccolabium.*
         4. Lateral sepals lanceolate; leaves 2 to 7 mm broad.... 9. *D. wenzelii.*
      3. Labellum not distinctly saccate or spurred.
         4. Leaves terete, enclosing the peduncles almost to their apices.
            5. Middle lobe of the lip rigidly deflexed, appearing emarginate from above ..... 2. *D. sphacelatum.*
            5. Middle lobe of the lip not rigidly deflexed nor appearing emarginate from above.
               6. Lateral lobes of the lip abruptly narrowed to a point. 4. *D. luzonense.*
               6. Lateral lobes of the lip not abruptly narrowed to a point.
                  7. Middle lobe of the lip triangular or ligulate; sepals and petals 3-nerved ..... 3. *D. williamsii.*
                  7. Middle lobe of the lip quadrangular, apiculate; sepals and petals faintly 1-nerved..... 1. *D. tenellum.*
         4. Leaves flat at least above.
            5. Flowering peduncle adherent to the surface of the leaf.
               6. Middle lobe of the lip shorter than the lateral lobes; inflorescence congested ..... 7. *D. graminifolium.*
               6. Middle lobe of the lip subequal to the lateral lobes; inflorescence lax.

7. Middle lobe of the lip quadrangular, short mucronate.

8. Lateral sepals about 2.5 mm long and 1 mm broad; petals 2 mm long; leaves 15 to 20 cm long. 8. *D. stenophyllum.*

8. Lateral sepals 4 to 6 mm long, 2 to 2.5 mm broad; petals 4 to 6 mm long; leaves 20 to 40 cm long. 6. *D. montanum.*

7. Middle lobe of the lip subtriangular, long apiculate. 5. *D. perplexum.*

5. Flowering peduncle not adherent to the surface of the leaf.

6. Lip entire.

7. Lip oblong-ovate; leaves linear-oblong.... 27. *D. foxworthyi.*

7. Lip obovate; leaves linear..... 26. *D. macgregori.*

6. Lip 3-lobed.

7. Petals ovate to rhombic-ovate, about 2.5 mm long and 2 mm broad ..... 39. *D. exile.*

7. Petals narrowly lanceolate, about 2.2 mm long and 0.8 mm broad ..... 38. *D. vanoverberghii.*

2. Base of the leaf attenuated into a distinct petiole, leaves not grass-like nor sedge-like, not more than 20 times longer than broad.

3. Lip simple, not E-shaped or if 3-lobed, the lobes not separated by a sinus, often minutely auriculate at the base, rarely 3-dentate at the apex, not strongly saccate.

4. Lip (when flattened out) as broad or broader than long.

5. Sepals and petals with numerous ocelli..... 30. *D. ocellatum.*

5. Sepals and petals not as above.

6. Lip reniform or subreniform in outline.

7. Petals broadly ovate-rhomboid, obtuse..... 35. *D. turpe.*

7. Petals linear to broadly lanceolate, acute.

8. Petals linear-lanceolate, 3.5 mm long, 0.75 mm broad; bracts 2 to 2.5 mm long..... 23. *D. reniforme.*

8. Petals broadly lanceolate, 3.5 mm long, 1.3 mm broad; bracts about 3 mm long..... 33. *D. urciforme.*

6. Lip triangular or oval in outline.

7. Lip triangular in outline; lateral sepals suborbicular, 2 mm long, 2.5 mm broad ..... 31. *D. oliganthum.*

7. Lip oval in outline; lateral sepals linear-lanceolate, 6 mm long, 2 mm broad ..... 56. *D. elmeri.*

4. Lip (when flattened out) longer than broad.

5. Lip with an uncinate callus which is directed back over the cavity at the base of the column..... 29. *D. unicorne.*

5. Lip not as above.

6. Lip oblong-ovate or oblong-pandurate; leaves not strictly linear, usually always more than 3 mm broad.

7. Lip oblong-pandurate, usually conspicuously tridentate at the apex ..... 28. *D. rhombophorum.*

7. Lip oblong-ovate, not tridenticulate at the apex.

8. Sepals oblong-lanceolate, about 2 mm long and 1 mm broad; petals rhombic-ovate to obovate, about 2 mm long and 1 mm broad..... 27. *D. foxworthyi.*

8. Sepals lanceolate, 4 to 5 mm long, 1.5 to 2 mm broad; petals cuneate-ovate, 3 to 4.5 mm long and 2 to 2.8 mm broad ..... 32. *D. purpureum.*

6. Lip obovate; leaves strictly linear, 2 to 3 mm broad. 26. *D. macgregori.*

3. Lip not simple. E-shaped or at least 3-lobed, the lobes separated by a sinus or the lateral lobes extending at right angles to the middle lobe; in one species the lip strongly saccate.

4. Lip 3-lobed or apparently 4 to 5-lobed, not E-shaped, the lateral lobes either extending at right angles to the mid-lobe or very small.

5. Lip hastate; column winged at the apex..... 57. *D. hastatum.*

5. Lip not hastate; column not winged at the apex.

6. Lip pandurate, oblong, the lateral lobes very small.

7. Leaves marginate; lip solidly attached to the column. 36. *D. marginatum.*

7. Leaves not marginate; lip articulated to the base of the column ..... 58. *D. merrillii.*

6. Lip not pandurate or oblong, the lateral lobes fairly large or if the mid-lobe is semi-orbicular the lateral lobes are very small.

7. Mid-lobe retuse at the apex; lateral lobes fairly large.

8. Lip with an apiculation in the notch; lip less than 1 mm long ..... 16. *D. quadrilobum.*

8. Lip without an apiculation in the notch; lip 3 mm or more long ..... 55. *D. auriculare.*

7. Mid-lobe not retuse at the apex; lateral lobes very small and basal or apparently none..... 35. *D. turpe.*

4. Lip 3-lobed or by lack of the middle lobe only 2-lobed, the lateral lobes either larger, subequal to or smaller than the middle lobe, but arcuate and directed parallel to the mid-lobe and not at right angles to it, i.e. E-shaped.

5. Middle lobe of the lip simple, not lobulate.

6. Middle lobe of the lip much shorter than the lateral lobes; sepals and petals lanceolate..... 17. *D. tenuifolium.*

6. Middle lobe of the lip subequal to or longer than the lateral lobes; sepals and petals lanceolate or usually broader.

7. Middle lobe of the lip subequal to the lateral lobes, triangular ..... 44. *D. schweinfurthianum.*

7. Middle lobe of the lip longer than the lateral lobes, not triangular.

8. Middle lobe of the lip ligulate, refracted; sepals 3 to 4 mm broad ..... 43. *D. sanguineum.*

8. Middle lobe of the lip oblong-trulliform, not refracted; sepals 1.5 to 2.2 mm broad..... 37. *D. philippinense.*

5. Middle lobe of the lip not simple usually distinctly trilobulate or retuse with an apiculation in the notch.

6. Middle lobe of the lip retuse with a linear apiculation in the notch which is longer than the rest of the lobe. 54. *D. apiculatum.*

6. Middle lobe of the lip not as above.

7. Petals linear to lanceolate, 2.5 to 4 times longer than broad.

8. Middle lobe of the lip transversely oblong, as broad as the lip ..... 50. *D. eximium.*

8. Middle lobe of the lip not as above.

9. Lateral veins of the leaf marginate.

10. Middle lobule of the mid-lobe of the lip largest, directed outward; lateral sepals 3 to 4 mm long. 13. *D. strictiforme.*

10. Middle lobule of the mid-lobe of the lip subequal to or smaller than the lateral lobules; lateral sepals about 2.5 mm long..... 14. *D. parvulum.*

9. Lateral veins of the leaf not marginate.

10. Middle lobe of the lip much exceeding the lateral lobes.

11. Lateral lobes of the lip at right angles to the mid-lobe; petals 1 to 1.3 mm long and 0.3 mm broad ..... 16. *D. quadrilobum.*

11. Lateral lobes of the lip arcuate, nearly parallel to the mid-lobe.

12. Leaves linear, 3 mm or less broad. 38. *D. vanoverberghii.*

12. Leaves lanceolate, more than 3 mm broad.

13. Mid-lobe of the lip saggitate, deflexed; petals about 2 mm long, 0.5 mm broad. 19. *D. curranii.*

13. Mid-lobe of the lip transversely oblong, apiculate; petals about 3 mm long, 1 mm broad ..... 34. *D. oreophilum.*

10. Middle lobe of the lip shorter than or subequal to the lateral lobes.

11. Mid-lobe of lip very much shorter than lateral lobes.

12. Middle lobe of the lip entire; leaves linear, acute ..... 17. *D. tenuifolium.*

12. Middle lobe of the lip equally trilobulate; leaves elliptic-oblong, obtuse.
15. *D. binuangense.*

11. Middle lobe of the lip subequal in length to the lateral lobes.

12. Leaves linear to linear-oblong, obtuse or sometimes acute in *D. pulogense.*

13. Petals 2.2 to 5 mm long.... 12. *D. pulogense.*

13. Petals 1.2 to 2 mm long.

14. Lateral sepals linear-lanceolate to lanceolate, 2 to 2.7 mm long; leaves mostly linear-oblong ..... 18. *D. microchilum.*

14. Lateral sepals broadly lanceolate, 1.5 to 2 mm long; leaves linear.
21. *D. mindanaense.*

12. Leaves lanceolate or broader, obtuse or acute.

13. Petals 4 to 6 mm long 1 to 1.8 mm broad.
11. *D. loheri.*

13. Petals about 2 mm long, 0.5 mm broad.

14. Mid-lobe of the lip saggitate.
19. *D. curranii.*

14. Mid-lobe of the lip not saggitate.

15. Lateral sepals ovate lanceolate, 2 mm long..... 19a. *D. curranii* var. *serratoi.*

15. Lateral sepals ovate-lanceolate, 1.5 to 2 mm long; petals broadly ovate, 1.2 to 1.7 mm long (cr. also next division of key) ..... 20. *D. asperum.*

7. Petals broadly lanceolate or broader, 1 to 1.7 (or 2 ??) times longer than broad.

8. Lip E-shaped, the lateral lobes arcuate and parallel to the mid-lobe or nearly so.

9. Lateral lobes of the lip longer than the mid-lobe or the latter lacking.

10. Mid-lobe of the lip lacking or very small, if present equally trilobulate; leaves linear; lip not saccate. 22. *D. abortum.*

10. Mid-lobe of the lip present, subquadrate, apiculate; leaves lanceolate; lip decidedly saccate. 49. *D. simulacrum.*

9. Lateral lobes of the lip shorter than or about subequal to the mid-lobe.

10. Lateral lobes of the lip shorter than the mid-lobe.

11. Mid-lobe of the lip simple.

12. Lateral veins of the leaf not marginate.

13. Middle lobe of the lip ligulate, strongly deflexed; leaves linear-lanceolate, 3 to 7 mm broad ..... 43. *D. sanguineum.*

13. Middle lobe of the lip trulliform, not deflexed; leaves linear-lanceolate to oblong-lanceolate, 11 to 30 mm broad. 37. *D. philippinense.*

12. Lateral veins of the leaf marginate; mid-lobe of the lip triangular. 44. *D. schweinfurthianum.*

11. Middle lobe of the lip not simple, trilobulate.

12. Petals 2.6 to 3 mm long, 1.2 to 1.8 mm broad; mid-lobe of the lip subquadrate-apiculate. 48. *D. longibulbum.*

12. Petals 3.5 to 4.5 mm long, 2 to 2.6 mm broad; mid-lobe of the lip saggitate or subsaggitate.

13. Lateral sepals lanceolate to broadly lanceolate; petals obtuse; mid-lobe of the lip subsaggitate ..... 41. *D. affine.*

13. Lateral sepals rhombic-ovate; petals acuminate mid-lobe of the lip hastate. 42. *D. cinnabarinum.*

10. Lateral lobes of the lip about subequal to the mid-lobe.

11. Lip strongly saccate, the sac about 1 mm deep. 49. *D. simulacrum.*

11. Lip not as above.

12. Leaves linear, 2.5 mm broad or less. 39. *D. exile.*

12. Leaves lanceolate or broader, 3 mm or more broad.

13. Bracts of the inflorescence 4 to 5 mm long; raceme strongly fractiflex.

14. Mid-lobe of the lip transversely oval, apiculate, the sinus open; plant of Mindoro. 52. *D. hutchinsonianum.*

14. Mid-lobe of the lip not as above; plants of Luzon.

15. Lateral lobes of the lip obtuse; sinus deep, closed..... 51. *D. irigense.*

15. Lateral lobes of the lip acute; sinus nearly obsolete.

16. Mid-lobe of the lip consisting of one acute and two obtuse lobules which are rather carinate on the margins. 53. *D. anfractum.*

16. Mid-lobe of the lip consisting of three acute lobules which are not carinate on the margins. 53a. *D. anfractum* var. *anfractoides.*

13. Bracts of the inflorescence 4 mm or less long; raceme not strongly fractiflex.

14. Petals 1.2 to 1.7 mm long; bracts of the inflorescence about 2 mm long. 20. *D. asperum.*

14. Petals 2 to 6 mm long; bracts of the inflorescence 2.5 to 5 mm long.

15. Mature pseudobulbs 5 to 9 cm long, very slender ..... 46. *D. tenuibulbum.*

15. Mature pseudobulbs less than 5 mm long.

16. Middle lobe of the lip subtriangular in outline; plants of Mindoro. 45. *D. mindorense.*

16. Middle lobe of the lip subquadrate in outline; plants of Luzon.

17. Lateral sepals acute; petals 1.2 to 1.8 mm broad. 48. *D. longibulbum.*

17. Lateral sepals obtuse; petals 2.2 to 4 mm broad.

18. Petals 2.2 to 2.7 mm broad. 47. *D. remurvum.*

18. Petals 3 to 4 mm broad. 40. *D. pumilum.*

8. Lip not E-shaped, either oblong or semi-orbicular, the lateral lobes minute, not arcuate.

9. Lip oblong-pandurate..... 58. *D. merrillii.*

9. Lip semi-orbicular ..... 35. *D. turpe.*

1. DENDROCHILUM TENELLUM (Nees and Meyen) Ames

Dendrochilum tenellum (Nees and Meyen) AMES, Philip. Jour. Sci. 2C (1907) 318; AMES, Orch. 2 (1908) 81; PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 112, *fig. 37c E. G. J.*

Acoridium tenellum NEES and MEYEN, Nov. Act. Nat. Cur. 19 Suppl. 1 (1843); ROLFE, Orch. Rev. 12 (1904) 220; AMES, Orch. 1 (1905) 3, *t. 1, figs.*, in MERR., Enum. Philip. Fl. Pl. 1 (1924) 290.

Dendrochilum junceum REICHB. f., Otia Bot. Hamb. 1 (1878) 54; Xenia Orch. 3 (1881) 30.

Leaves terete, linear, rush-like, about 30 to 40 cm long, about 1 mm wide; inflorescence fairly congested, alternate flowers about 1 mm apart; bracts plain or sphacelate margined, about 1 mm long and as broad, glumaceous; lateral sepals oblong-lanceolate, about 2 mm long; petals rhomboid-spathulate, about 2 mm long; lip 3-lobed, 0.5 to 1 mm long, lateral lobes ovate-falcate, middle lobe apiculate, rounded, apex recurved or straight.

CAMIGUIN (Babuyanes Is.), Camiguin Volcano, *Bur. Sci. 79580 Edaño,* March 1, 1930; Babuyanes, *Bur. Sci. 4126 Fenix,* June to July, 1907.

LUZON, Kalinga Subprovince, Balbacan, *Boettcher s.n.,* alt. 1,000 m, March, 1918: Apayao Subprovince, Mt. Sulu, *Bur. Sci. 28378 Fenix,* alt. 1,000 m, May, 1917: Ifugao Subprovince, Mt. Polis, *Bur. Sci. 19874 McGregor,* February, 1913: Benguet Subprovince, Mt. Tonglon, *Bur. Sci. 5353 Ramos,* December, 1908; Mt. Luson, *Bur. Sci. 22 Ramos* and *Edaño,* alt. 5,600 ft., October 7, 1921; Baguio, *Sandkuhl 97,* June to July, 1915: Bontoc Subprovince, Mt. Masapilid, *Bur. Sci. 37924 Ramos* and *Edaño,* March, 1920; *Vanoverbergh 1064,* January, 1911: Zambales Province, *Bur. For. 9507, 9510 Curran* and *Merritt,* December, 1907; *Bur. Sci. 5004 Ramos,* November to December, 1907: Bataan Province, Lamao River, Mt. Mariveles, *Bur. For. 742 Borden,* May 1904; Lamao Forest Reserve, *Bur. For. 1676 Foxworthy,* October 17, 1906; *Merrill 3209,* October, 1903; *Meyer 2202,* December, 1904; *Topping 5178; Weber 18,* alt. 2,850 ft., February 10, 1911; *Bur. For. 233 Whitford,* May, 1904, *1357* September, 1905; *Williams 427,* January 2, 1904, *758,* March 24, 1904; Cagayan Province, Mt. Cagua, *Bur. Sci. 78640 Edaño,* October to November, 1929; Mt. Balatongan, *Bur. Sci. 78663 Edaño,* November, 1929: Nueva Vizcaya Province, *Bur. Sci. 20102 McGregor,* January, 1913: Laguna Province, Los Baños, Mt. Maquiling, *Elmer 17872,* June to July, 1917; *Bur. For. 13308 Tamesis,* September, 1909: Rizal Province, *Loher 14727,* September, 1909: Camarines Sur Province, on trees, on summit of Mt. Isarog, *Bur. Sci. 76468 Edaño,* alt. 5,000 ft., December,

1928: Sorsogon Province, Irosin (Mt. Bulusan), *Elmer 16299*, June, 1916; Vicinity of Luçonia, *Wilkes Expedition* (Gray Herbarium), 1838 to 1842. MINDORO, Mt. Halcon, *Merrill 5720*, November, 1906, and *5839*, November, 1906. LEYTE, Jaro (and vicinity), *Venzel 276, 332, 500, 888, 919* and *927*, alt. 500 to 750 m, February 5 to July 8, 1914 to 1915.

This species and the following species, *D. sphacelatum*, are the most difficult of differentiation and the most variable among the narrow-leaved species. The variation to be found in the shape and structure of the lip is most variable, sometimes being quite saccate, others not at all, at times strongly recurved, again hardly at all. In *D. tenellum* the lip, as pointed out and illustrated by Ames in 1905 (Orch. 1 (1905) *t. 1*), is much less recurved than in its ally *D. sphacelatum*, this character itself is subject to variation in both species so that it may not be definitely used to separate the species. The sphacelate character of the bracts in *D. sphacelatum* is, unfortunately, found in both of the species. The characters which must be used are those of the lip, lateral and middle lobes, shape and size and the more variable characters mentioned above. If *D. tenellum* and *D. sphacelatum* are distinct it is on this accumulation of small characters.

2. DENDROCHILUM SPHACELATUM (Ames) Pfitzer

Dendrochilum sphacelatum (Ames) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 112, *fig. 37, A, B, D, F, H, K;* AMES, Orch. 2 (1908) 82, 5 (1915) 64, 6 (1920) 287.

Acoridium sphacelatum AMES, Orch. 1 (1905) 1, *t. 1, figs. 1, 4–6, 8, 10, 12, 16, 18, 20;* MERR., Enum. Philip. Fl. Pl. 1 (1924) 289.

Leaves terete, linear, rush-like, 15 to 45 cm long, about 1 mm broad; inflorescence fairly congested, alternate flowers about 1.5 mm apart; bracts sphacelate, 1.75 to 2.5 mm long, glumaceous; lateral sepals ovate-lanceolate, about 2.5 mm long; petals rhomboid-sphathulate, about 1.5 mm long; lip 3-lobed, 0.5 to 1 mm long, lateral lobes oblong-falcate, slightly exceeding or subequal to the middle lobe, middle lobe oblong, with a strongly deflexed, apiculate apex (if care is not taken in dissection middle lobe will appear emarginate).

LUZON, Benguet Subprovince, Mt. Santo Tomas, *Elmer 6554* (type); *Boetcher s.n.*, May, 1918.

For the discussion of this species see the preceding species.

3. DENDROCHILUM WILLIAMSII (Ames) Pfitzer

Dendrochilum williamsii (Ames) PFITZER Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 114, *fig. 38;* AMES, Orch. 2 (1908) 12, 82, *t. 22, figs. I, 1.*

Acoridium williamsii AMES, Biol. Soc. Wash. Proc. 19 (1906) 143; MERR., Enum. Philip. Fl. Pl. 1 (1924) 291.

Leaves rush-like, terete, 20 to 40 cm long, 1 to 3 mm broad, acute; inflorescence lax, subterminal, often exceeding the leaf; bracts 2 to 3 mm long, glumaceous; lateral sepals ovate-lanceolate, about 3 mm long, 1.5 mm broad, 3-nerved, acute; petals oblanceolate, about 3 mm long, 1 mm broad; lip 3-lobed, lateral lobes oblong-falcate, obtuse, middle lobe subtriangular to broadly ligulate.

LUZON, Lepanto Subprovince, on trees, mossy forest, Mt. Data, *Bur. Sci. 5 Ramos* and *Edaño,* alt. 7,630 ft., September 21, 1921: Benguet Subprovince, Mt. Santo Tomas, *Bur. Sci. 5317 Quisumbing,* October 9, 1929; on rocks, Trinidad, *Williams 1936* (isotype), September 28, 1904: Rizal Province, Montalban, *Loher 12626,* October, 1912; Mt. Irid, *Bur. Sci. 48422, 48465, 48476 Ramos* and *Edaño,* November, 1926; Mt. Tokduanbanoy, *Bur. Sci. 48595, 48601 Ramos* and *Edaño,* November, 1926.

Dendrochilum williamsii is easily distinguished from the other species of the linear-leaved group by size of flowers and particularly by the structure of the middle lobe of the lip.

4. DENDROCHILUM LUZONENSE Ames

Dendrochilum luzonense AMES, Orch. 2 (1908) 121, *text cut,* 5 (1915) 60.

Acoridium luzonense AMES, Orch. 7 (1922) 81; Merr., Enum. Philip. Fl. Pl. 1 (1924) 286.

Leaves terete, slender, 15 to 50 cm long, 1 to 2 mm broad, obtuse or acute, the tip often callused, inflorescence crowded, surpassing the subtending leaf; bracts 2.5 to 3 mm long, glumaceous; lateral sepals lanceolate, acuminate, 3.5 to 5 mm long, about 1.5 mm broad; petals 3 to 5 mm long, somewhat erose on the adjacent margins; lip 3-lobed, about 1 mm long, the lobes subequal in length, the lateral lobes subfalcate and usually attenuated into a distinct apiculation at the apex, the middle lobe quadrangular, mucronate.

LUZON, Lepanto Subprovince, *Bur. For. 5735 Klemme,* November 19, 1906; epiphyte in mossy forest; Mt. Pangualitikai, alt. 6,000 ft., *Bur. Sci. 21 Ramos* and *Edaño,* October 13, 1921: Benguet Subprovince, *Bur. For. 15729 Curran* and *Merritt,* December, 1908; *Bur. Sci. 5772 Ramos,* December, 1908.

The present species is not very closely allied to any of the other linear-leaves species. In aspect it approaches *D. williamsii* but the more compact inflorescence and the very different structure of the flowers make it amply distinct.

5. **DENDROCHILUM PERPLEXUM (Ames) L. Wms., comb. nov.**

Acoridium perplexum AMES, Orch. 7 (1922) 142; MERR., Enum. Philip. Fl. Pl. 1 (1924) 288.

Leaves flat, except toward the base, 20 to 50 cm long, 2 to 4 mm broad at the broadest point; inflorescence lax, 5 to 8 cm long, peduncle adherent to the surface of the subtending leaf; bracts 2.5 to 3 mm long, glumaceous; lateral sepals broadly lanceolate, acuminate, 5 to 6 mm long, 1.5 to 2 mm broad; petals lanceolate, 4 to 5 mm long, about 1.5 mm broad at the middle; lip 3-lobed, about 2 mm long and 3 mm broad, lateral lobes pandurate, middle lobe quadrate-trulliform, exceeded in length by the lateral lobes or subequal to them.

LUZON, Lepanto Subprovince, mossy forest, Mt. Sinapsapan, alt. 6,000 ft., *Bur. Sci. 55 Ramos* and *Edaño* (type), October 13, 1921.

See discussion of the next species.

6. **DENDROCHILUM MONTANUM (Ames) L. Wms., comb. nov.**

Acoridium montanum AMES, Sched. Orch. 5 (1923) 1; MERR., Enum. 1 (1924) 287.

Acoridium linearifolium AMES, Orch. 7 (1922) 141, non Rolfe, 1904.

Leaves flat except toward the base, 20 to 40 cm long, 2 to 3 mm broad, acute; inflorescence lax 6 to 10 cm long, peduncle adherent to the surface of the subtending leaf; bracts 2.5 to 3.5 mm long, glumaceous; lateral sepals broadly lanceolate, acute, 4 to 6 mm long, 2 to 2.5 mm broad; petals lanceolate, 4 to 5 mm long, 1 to 1.5 mm broad; lip 3-lobed, about 2 mm long, lateral divisions subrectangular, somewhat dilated toward the rounded apex and base, about 2 mm long and 1 mm broad, middle lobe rectangular, apiculate, restricted above the apex, subequal to the lateral lobes, about 1 mm long and 1.5 mm broad.

LUZON, Benguet Subprovince, on trees, mossy forest, Mt. Boadan, *Bur. Sci. 56 Ramos* and *Edaño* (type), alt. 6,000 ft., September 25, 1921.

This species has its closest ally in *D. perplexum*, from which it can be distinguished mainly by the characters of the lip. Habitually the two species are almost identical.

7. **DENDROCHILUM GRAMINIFOLIUM (Ames) Pfitzer**

Dendrochilum graminifolium (Ames) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 114, *fig. 38*, Q. R.; AMES, Orch. 2 (1908) 12, 83, *t. 22, figs. II, 2;* Idem. 5 (1915) 57.

Acoridium graminifolium AMES, Biol. Soc. Wash. Proc. 19 (1906) 144; MERR., Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves flat except at the base, 15 to 40 cm long, 2.5 to 4 mm broad, acute; inflorescence congested, 4 to 7 cm long; peduncle

adherent to the surface of the subtending leaf; bracts 1.5 to 3 mm long glumaceous; lateral sepals broadly lanceolate, 3 to 4 mm long, 1 to 1.5 mm broad; lip 3-lobed, lateral lobes oblong, auriculate on the outer side at the base, about 2 mm long, middle lobe of the lip oblong, short apiculate, decidedly shorter than the lateral lobes.

LUZON, Benguet Subprovince, on trees, from Bone to Piapeso, *Bur. For. 15907 Bacani,* December 14, 1908; Pauai, *Bur. Sci. 8487 McGregor,* alt. 2,100 m, June, 1909; Stryoc to Pauai, *Merrill 4764* (type), October to November, 1905; trail from Mancayan to Baguio, near Pauai, *Bur. Sci. 32 Ramos* and *Edaño,* October, 1921; Lepanto Subprovince, trial to Balbalassan, *Bur. For. 5734 Klemme,* November 19, 1906; Mt. Data, *Merrill 4594,* November, 1905.

8. **DENDROCHILUM STENOPHYLLUM L. Wms., nom. nov.**

Acoridium angustifolium AMES, Blumea, Suppl. 1 (1937) 68, non *Dendrochilum angustifolium* RIDL.

Pseudobulbs fusiform, stem-like, much wrinkled at maturity, 2 to 3 cm long, in younger specimens covered by closely appressed sheaths which, in age, disintegrate; leaves linear, flat above, prominently nerved and caniculate, narrowed into a petiole toward the base, acute or acutish, 15 to 25 cm long, 2 to 3 mm broad; peduncles filamentose, shorter than the subtending leaf, very lightly adherent to the surface of the leaf or apparently free; inflorescence a distichous raceme, 3 to 6 cm long, interval between the alternate flowers 1 to 2 mm long; lateral sepals lanceolate, 3-nerved, acute, about 2.5 mm long; dorsal sepal similar in size and shape; petals ovate-lanceolate, 3-nerved, about 2 mm long and 1.5 mm broad, margins entire or slightly erose; lip 3-lobed, lateral lobes broadly crescent-shaped, about 1 mm long, middle lobe quadrangular, short apiculate, about 0.5 mm long, subequal to the lateral divisions, a callus opposite each sinus and one in the disk; column about 0.5 mm long.

LUZON, Rizal Province, *Loher 14637a, 14721,* September, 1909.

9. **DENDROCHILUM WENZELII Ames**

Dendrochilum wenzelii AMES, Orch. 5 (1915) 65.

Acoridium wenzelii AMES, Orch. 7 (1922) 82; MERR., Enum. Philip. Fl. Pl. 1 (1924) 291.

Leaves flat or infolded but not terete, 10 to 40 cm long, 2 to 7 mm broad, acute; inflorescence congested, usually surpassing the subtending leaf; bracts 3 to 5 mm long, glumaceous; lateral sepals broadly lanceolate to ovate-lanceolate, 3 to 5 mm long, 1.5 to 2 mm broad; petals oblong-lanceolate, 2 to 3 mm long,

about 1 mm broad, slightly erose; lip 3-lobed, 1.3 to 2 mm long, lateral lobes ovate, middle lobe strongly saccate, indented along the middle of the sac.

LUZON, Kalinga Subprovince, Balbalan, *Boettcher s.n.*, alt. 1,000 m, March, 1918: Camarines Province, Saguay, *Bur. Sci. 22161 Ramos,* December, 1913. LEYTE, Jaro (and vicinity), *Wenzel 264* (type), February, 1914, *338,* March 9, 1914, *862,* February 14, 1915, *876,* February 16, 1915, *886,* February 19, 1915, *787,* December 3, 1914.

Dendrochilum wenzelii is closely allied to *D. saccolabium*. It differs from that species in the usually narrower leaves, in structure and shape of the lip and in the shape of the lateral sepals.

10. DENDROCHILUM SACCOLABIUM Kranzl.

Dendrochilum saccolabium KRÄNZL., Ann. K. K. Hofmus. Wien 30 (1916) 56.

Acoridium saccolabium (Kränzl.) AMES, Sched. Orch. 5 (1923) 2; MERR., Enum. Philip. Fl. Pl. 1 (1924) 289.

Leaves infolded except usually the upper part flat, apex plicate, acute, 20 to 30 cm long, expanded portion 6 to 9 mm broad; inflorescence congested, up to 11 cm long, surpassing the subtending leaf; peduncle apparently not adherent to the leaf but enfolded by it; bracts broadly ovate, spotted, about 4 mm long; lateral sepals suborbicular, 2 to 2.5 mm long, 2.5 to 3.5 mm broad; lip 3-lobed, about 2 mm long, lateral lobes linear-lanceolate, inconspicuous, middle lobe deeply saccate, apiculate.

PHILIPPINES, without locality, *Loher s.n.* (a fragment said by Schlechter to have been taken from the living type cultivated at Nymphenburg where it was sent by Loher from the Philippines. LUZON, Rizal Province, *Loher s.n.*, September, 1909, *Loher 13886,* January, 1913, *Loher 14719, 14735,* September, 1909: Laguna Province, *Bur. Sci. 42520 Taguibao,* April, 1923 (specimen sterile but very probably this species).

Closely allied to *D. wenzelii* which see for contrast. This rare species, so far as available specimens show has been collected only by Loher; unfortunately no one of the collections known gives a definite locality. Dr. E. D. Merrill is of the opinion that the collections were possibly made in eastern Rizal Province or possibly in adjacent Quezon Province.

It does not seem improbable that one of the collections cited above was collected at the same time as the living material sent to Nymphenburg which Kränzlin later studied, hence one of them is no doubt the same as a type collection.

11. DENDROCHILUM LOHERI Ames

Dendrochilum loheri AMES, Orch. 3 (1908) 12, *t. 27, fig. I, A;* Orch. 6 (1920) 283.
Acoridium loheri AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 286.

Leaves linear-oblong, acute or obtuse, 3 to 6 cm long, 3 to 5 mm broad, with 3 prominent nerves, the lateral pair near the margin; inflorescence lax, surpassing the leaves; bracts 3 to 4 mm long; lateral sepals broadly lanceolate, acute, 4.5 to 6 mm long, 1.8 to 2.5 mm broad; petals linear-lanceolate to lanceolate, acute or acuminate, 4 to 6 mm long, 1 to 1.8 mm broad; lip 3-lobed, about 1.5 mm long and 2.5 mm broad when spread out; lateral lobes broadly ovate-falcate, obtuse, about 1.5 mm long and 1 mm broad; mid-lobe transversely reniform, apiculate, usually strongly plicated, slightly exceeding the lateral lobes when spread out.

LUZON, Benguet Subprovince, Mt. Santo Tomas, *Boettcher s.n.*, May, 1918. "Philippine Islands," *Loher 461A.*

This species is most closely related to *D. pulogense.* Ames compared it to *D. venustulum* (*D. microchilum*) saying that additional material might possibly break down the distinction but that he did not think this probable. *D. loheri* (with *D. pulogense*) is probably as closely allied to the group to which *D. microchilum* belongs as to any other but this species is not to be confused with that species nor is it likely that it will ever be reduced to any species of that alliance.

12. DENDROCHILUM PULOGENSE Ames

Dendrochilum pulogense AMES, Philip. Jour. Sci. § C 4 (1909) 594.
Acoridium pulogense AMES, Orch. 7 (1922) 81; MERR., Enum. 1 Philip. Fl. Pl. (1924) 288.

Leaves linear to narrowly oblong-linear, obtuse or acute, 2 to 9 cm long, 2 to 5 mm broad, with 3 or 5 main veins, the lateral pair near or on the margin; inflorescence surpassing the leaves, lax; bracts 2 to 3.5 mm long; lateral sepals lanceolate to broadly lanceolate, acute or acuminate, 2.5 to 4.7 mm long, 1 to 2 mm broad; petals linear-lanceolate to ovate-lanceolate, acute to acuminate, 2.2 to 5 mm long, 0.8 to 1.5 mm broad; lip 3-lobed about 0.7 to 1.1 mm long and 1.5 to 2 mm broad when spread out; lateral lobes ovate-falcate, obtuse 0.7 to 1 mm long; middle lobe more or less subequal in length to the lateral lobes, subquadrate apiculate or often trilobulate with the lateral lobules explanate.

LUZON, Benguet Subprovince, Mt. Pulog, *Boettcher s.n.*, June, 1918; *Bur. For. 16347 Curran, Merritt,* and *Zschokke, Bur. Sci. 8842, 8843 McGregor,* July, 1909; *Merrill 6476, 6478,* May, 1909; Mt. Simakoko, epiphyte in mossy forest, *Bur. Sci. 24, 33 Ramos* and *Edaño,* alt. 6,200 ft., October 5, 1921; Pauai, *Haight 2,* June 21, 1913; *Bur. Sci. 8355 McGregor,* alt. 2,100 m, June, 1909.

This species, as understood here, is a most variable one in shape and size of perianth parts, as can be easily seen from the description of those parts. An attempt to split up the species would seem to be an unwise course because the variations can often be found in the same collections.

13. **DENDROCHILUM STRICTIFORME (Ames) Pfitzer**

Dendrochilum strictiforme (Ames) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 116, *fig. 38, L.;* AMES, Orch. 2 (1908) 12, 89, *t. 21, fig. III, 3.*

Acoridium strictiforme AMES, Biol. Soc. Wash. Proc. 19 (1906) 147; MERR., Enum. Philip. Fl. Pl. 1 (1924) 290.

Leaves linear, linear-oblanceolate to elliptic-oblong, obtuse, 2 to 8 cm long, 0.2 to 0.4 cm broad, with 3 main nerves, the lateral two on the margin of the leaf and giving it a marginate appearance; bracts 2 to 2.5 mm long; lateral sepals lanceolate to lanceolate-ovate, acute or acuminate, 3 to 4 mm long, about 1 mm broad; petals linear-lanceolate, acute, 2.7 to 3 mm long, 0.5 to 0.7 mm broad; lip 3-parted, the lateral lobes falcate obtuse, about 1 mm long, middle lobe division trilobulate about subequal in length to the lateral lobes, the largest lobule terminal, the smaller two lateral.

LUZON, Benguet Subprovince, Pauai, *Haight 6,* June 10, 1913; *Bur. Sci. 8354, 8357, 8559 McGregor,* alt. 2,100 m, June, 1909; epiphyte in mossy forest, Mt. Pulogloco, *Bur. Sci. 28, 29 Ramos* and *Edaño,* alt. 6,700 ft., September 30, 1921; Suyoc to Pauai, *Merrill 4854,* alt. 6,500 ft., October to November, 1905: Lepanto Subprovince, epiphyte in forest, Mt. Sinapsapan, *Bur. Sci. 8, 17 Ramos* and *Edaño,* alt. 6,000 ft., October 11, 1921.

Dendrochilum strictiforme is very closely allied to *D. parvulum.* The main point of distinction is in the structure of the lip and the slight differences to be found in the perianth and leaves. In all the available material the character of the lip is constant.

14. DENDROCHILUM PARVULUM (Ames) Pfitzer

Dendrochilum parvulum (Ames) PFITZER, Engler's Pflanzer. IV. 50. II. B. 7 (1907) 116, *fig. 38 N;* AMES, Orch. 2 (1908) 12, 87, *t. 21, fig. II, 2.*

Acoridium parvulum AMES, Biol. Soc. Wash. Proc. 19 (1906) 146; MERR. Enum. Philip. Fl. Pl. 1 (1924) 288.

Acoridium venustulum AMES, l. c. 147.

Dendrochilum venustulum PFITZER, l. c.

Leaves linear to oblong-oblanceolate, obtuse and often slightly retuse, 2 to 9 cm long, 4 to 12 mm broad, with 3 main nerves, the two lateral ones on the margin of the leaf or very near it giving the leaf a marginate appearance; inflorescence congested, usually surpassing the leaves; bracts 1.7 to 2.5 mm long; lateral sepals lanceolate to oblong-lanceolate, acute or acuminate, about 2.5 mm long, 1 to 1.5 mm broad; petals linear-lanceolate, acute, about 2.5 mm long, 0.7 to 1 mm broad; lip 3-parted, the lateral divisions broadly ovate-falcate, about 1 mm long, middle division of the lip 3 lobulate, the lobules directed outward, strongly and rigidly deflexed, subequal in length (when straightened out) to the lateral divisions.

LUZON, Benguet Subprovince, *Bur. Sci. 15925, Bacani,* December, 1908; Mt. Santo Tomas, *Boettcher s.n.,* May, 1918; *Elmer 6273* (type *A. venustulum*), May, 1904; on tree mossy forest, *Bur. Sci. 5321 Quisumbing,* October 9, 1929; Mt. Tonglon, *Copeland s. n.,* May 2, 1909; Mt. Pauai, *Bur. Sci. 8453 McGregor,* alt. 2,100 m, June, 1909; *Merrill 6635,* May, 1909; *Bur. Sci. 31789, 31790 Santos,* April to June, 1918; Haights Place, in mossy forest, *Taylor 28,* alt. 2,500 m, April 16 to May 16; no locality, *Merrill 7755, 7757, 7760,* May, 1911; *Bur. Sci. 5840 Ramos,* December, 1908: Bontoc Subprovince, *Clemens 16313,* December, 1925; *Vanoverbergh 1017,* December 3, 1910; *Vanoverbergh 1050,* January, 1911; *Vanoberbergh 4049,* May 16, 1916: Lepanto Subprovince, Mt. Sinapsapan, epiphyte in mossy forest, *Bur. Sci. 53, 118 Ramos* and *Edaño,* October 11 to 13, 1921: Cagayan Province, Mt. Cagua Volcano, *Bur. Sci. 78645, 78646, 78655, 78667 Edaño,* alt. 4,200 ft., October to November, 1929: Nueva Vizcaya Province, on dead trees, *Bur. Sci. 20206, 20207 McGregor,* January, 1913: Bataan Province, Mt. Mariveles, Lamao River, *Merrill 32176* (type); *Bur. For. 141 Whitford,* May, 1904: Rizal Province, on trees, summit of Mt. Lumutan, *Bur. Sci. 29724, 29732 Ramos* and *Edaño,* alt. 200 m, July, 1917: Laguna Province, Mt. Banajao, *Bur. For. 8024 Curran*

and *Merritt,* November 10, 1907: Quezon (Tayabas) Province, Lucban, *Elmer 9252,* May, 1907.

The reduction of *D. parvulum* and *D. venustulum* to the same entity is felt to be justifiable in the light of the material which has been received since the time they were published. As the plants are here understood the types of the two names represent extremes in a difficult and complicated series and very probably the validity of them as distinct species would not be questioned were it not for this connection series.

Dendrochilum parvulum has the most complicated lip-structure of this small closely allied group of species, the mid-lobe is strongly deflexed but the lower part is quite saccate. Structure is further complicated by two large calli in the sinuses and a smaller third one in the slightly saccate basin.

15. DENDROCHILUM BINUANGENSE Ames

Dendrochilum binuangense AMES, Orch. 6 (1920) 281.
Acoridium binuangense AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 284.

Leaves narrowly oblong-elliptic, obtuse, 4 to 8 cm long, 8 to 11 mm broad, with 3 main veins, the lateral ones about 1 mm from the margin of the leaf; inflorescence much surpassing the leaves, congested; bracts 2.7 to 4 mm long; lateral sepals broadly lanceolate, acuminate, 3.5 to 4 mm long, 1 to 1.3 mm broad; petals lanceolate, slightly acuminate, about 3 mm long, 0.7 to 1 mm broad; lip 3 parted, lateral lobes orbicular-reniform, about 1 mm long, much exceeding the middle lobe, middle lobe quadrangular in outline, tridentate the teeth short, triangular subequal, much shorter than the lateral lobes.

LUZON, Quezon (Tayabas) Province, Mt. Binuang, *Bur. Sci. 28620 Ramos* and *Edaño,* May 27, 1917.

16. DENDROCHILUM QUADRILOBUM Ames

Dendrochilum quadrilobum AMES, Orch. 5 (1915) 61.
Acoridium quadrilobum AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. (1924) 288.

Leaves linear, obtuse, mucronate, 3 to 9 cm long, 2 to 4 mm broad, usually with 3-main nerves, the laterals on either side, not on the margin; inflorescence surpassing the leaves, appearing lax; bracts 1 to 1.5 mm long; lateral sepals linear-lanceolate, acuminate 2 to 2.2 mm long, 0.6 to 0.7 mm broad; petals linear, acute, 1 to 1.3 mm long, about 0.3 mm broad; lip 3-lobed (or apparently 4-lobed), about 0.75 mm long, the lateral lobes small, ovate, obtuse, apparently erect, the middle

lobe much exceeding the lateral divisions in length deeply notched at the apex and with a small triangular apiculation in the notch, the whole semirectangular in outline, not deflexed.

LUZON, Apayao Subprovince, *Boettcher s.n.*, alt. 200 m, January 19, 1918: Ifugao Subprovince, Mt. Polis, *Bur. Sci. 19894* (type), *19896 McGregor*, February, 1913.

Dendrochilum quadrilobum is a rare and interesting species from the standpoint of the structure of the lip, the very small, almost minute petals and general habit of the plant. No very close ally is known.

17. DENDROCHILUM TENUIFOLIUM (Ames) Pfitzer

Dendrochilum tenuifolium (Ames) PFITZER, Engler's Pflanzenr. IV. 50. H. B. 7 (1907) 114, *fig. 38;* AMES, Orch. 2 (1908) 12, 85, *t. 21, fig. IV, 4.*

Acoridium tenuifolium AMES, Biol. Soc. Wash. Proc. 19 (1906) 145; MERR., Enum. Philip. Fl. Pl. 1 (1924) 290.

Leaves linear, gradually tapering to both ends, acute, 4 to 15 cm long, 2 to 7 mm broad with three main nerves, the lateral ones not marginate; inflorescence always surpassed by the subtending leaf; bracts about 2 mm long; lateral sepals lanceolate to broadly lanceolate, acute, 2.5 to 3.2 mm long, 1 to 1.5 mm broad; petals lanceolate, acute, 2 to 3 mm long, 0.7 to 1 mm broad; lip 3-lobed; the lateral lobes oblong, obtuse directed forward at about right angle from the column, 1.2 to 1.5 mm long, the middle lobe ovoid, essentially entire, saccate, fleshy, greatly surpassed by the lateral lobes.

LUZON, Benguet Subprovince, Mt. Tonglon, *Bur. For. 4980 Curran,* August 8, 1906; Mt. Santo Tomas, *McClure 210,* September, 1925; Mt. Pulog, *Bur. Sci. 8811, 8820 McGregor,* July, 1909; Mt. Pulogloco, *Bur. Sci. 12 Ramos* and *Edaño,* alt. 6,800 ft., September 30, 1921; epiphyte, mossy forest, Mt. Boadan, *Bur. Sci. 14 Ramos* and *Edaño,* alt. 6,800 ft., September 26, 1921; epiphyte in mossy forest, Simakoko, *Bur. Sci. 15 Ramos* and *Edaño,* alt. 6,300 ft., October 5, 1921: Lepanto Subprovince, Mt. Data, *Merrill 4576* (type), October 29, 1905; epiphyte, mossy forest, Mt. Sinapsapan, *Bur. Sci. 16 Ramos* and *Edaño,* alt. 6,200 ft., October 11, 1921.

Dendrochilum tenuifolium is easily distinguished by means of the very long lateral lobes of the lip and the comparative short subsimple middle division. The species is known only from a small area.

18. **DENDROCHILUM MICROCHILUM** (Schltr.) Ames

Dendrochilum microchilum (Schltr.) AMES, Orch. 2 (1908) 87.
Platyclinis microchila SCHLTR., II. Herb. Boiss. Bull. 6 (1906) 302.
Acoridium tenue AMES, Biol. Soc. Wash. Proc. 19 (1906) 145.
Dendrochilum tenue PFITZER, Engler's Pflanzenr. IV. 50. H. B. 7 (1907) 116, *fig. 38 M*, AMES, Orch. 2 (1908) 2, 86, *t. 21, figs. 5, V.*
Acoridium microchilum (Schltr.) AMES, Orch. 7 (1922) 81, MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves linear to linear-oblong, obtuse, 2.5 to 10 cm long, 2 to 5 mm broad, with 3 main nerves, the 2 lateral ones not on the margin; inflorescence surpassing the leaves; bracts 1 to 2 mm long; lateral sepals linear-lanceolate to lanceolate, acute, 2 to 2.7 mm long, 0.5 to 1.5 mm broad; petals lanceolate, acute, 1.2 to 2 mm long, 0.5 to 1 mm broad; lip 3-lobed, the lateral lobes falcate, obtuse, the middle lobe deflexed, subquadrate, apiculate, subequal to the lateral lobes.

LUZON, Bontoc Subprovince, on trees, Bauco, *Vanoverbergh 1726,* alt. 1,700 m, November 8, 1912; *Vanoverbergh 3832,* alt. 1,700 m, October 10, 1913; *Vanoverbergh 3942,* August to September, 1914: Ifugao Subprovince, Mt. Polis, *Bur. Sci. 19891 McGregor,* February, 1913: Rizal Province, *Loher 14598a,* September, 1909.

LEYTE, Jaro, *Wenzel 259,* alt. 750 m, February 11, 1914; epiphyte in forest, Masaganap, *Wenzel 879,* alt. 700 m, February 17, 1915; epiphyte in forest, Buenavista, *Wenzel 887, 917,* alt. 500 to 700 m, February 11 to 19, 1915: NEGROS, *Bur. For. 13663 Curran,* September, 1909: MINDANAO, Davao Province, big bunch on mossy trees, trail to Apo, Mt. Apo, *Copeland 1019a* (type), alt. 5,400 ft., April 19, 1904: Bukidnon Province, vicinity of Tanculan, *Bur. Sci. 26160 Fenix,* July, 1916; Mt. Lipa, *Bur. Sci. 38518 Ramos* and *Edaño,* June to July, 1920. Locality unknown, "Kultiviert im einem Garten in Sandakan, Britisch Borneo; soll von Manilla importiert sein" *Schlechter s.n.*

This is one of the most widely distributed of the section *Acoridium,* as far as distribution in the genus is known at this time, being known from four islands. In a group in which species are restricted in their ranges, as a general rule, this distribution is of interest.

It is unfortunate that it is necessary to take *D. microchilum* for this entity and, at the time to use another name, *D. parvulum,* for the material which has been distributed as *A. microchilum.* The error in identity of this species dates from a letter from Schlechter to Ames concerning which Ames wrote an undated

annotation on the type sheet of *A. venustulum.* The annotation follows:

"In a letter Dr. Schlechter informs me that after an examination of Philippine material he finds his *Platyclinis microchila* the same as *Dendrochilum venustulum.*"

Dr. R. Mansfeld, formerly of the Botanischer Garten and Museum in Berlin-Dahlem, kindly sent a few flowers, a sketch showing venation in the leaf and an excellent photograph of Schlechter's type, which show that the name *D. microchilum* must be used in place of *D. tenue.*

19. DENDROCHILUM CURRANII Ames

Dendrochilum curranii AMES, Orch. 3 (1908) 15, *t. 29.*
Acoridium curranii AMES, Orch. 7 (1922) 80; MERR. Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves linear lanceolate to lanceolate, obtuse, short petiolate, 4 to 14 cm long, 0.4 to 1.2 cm broad with 3 main nerves, the lateral veins 1 mm or more from the margin; inflorescence surpassing the leaves, slender; bracts about 2 mm long; lateral sepals lanceolate, acute about 2.5 mm long; petals linear-lanceolate, acute, about 2 mm long, 0.5 mm broad; lip 3-lobed lateral lobes crescent shaped, obtuse, middle lobe saggitate, strongly deflexed, surpassing the lateral divisions, about .75 mm long.

LUZON, Rizal Province, Montalban, *Loher 12561,* May, 1909; *Reillo 19152,* December, 1912: Laguna Province, Mt. Maquiling, *Bur. For. 3077 Curran* (type in Herb. Ames, so designated here), January, 1908; epiphyte, Mt. Banahao, *Disdon s.n.,* alt. 2,000 m, February 6, 1913; *Bur. Sci. 19561 Ramos,* January, 1913; *Bur. Sci. 6575 Robinson,* January, 1909.

Dendrochilum curranii is most easily distinguished from the other small flowered species of the section by the deflexed saggitate mid-lobe of the lip.

19a. DENDROCHILUM CURRANII Ames var. SERRATOI (Ames) L. Wms., comb. nov.

Acoridium serratoi AMES, Sched. Orch. 6 (1923) 27, *fig. 6;* MERR. Enum. Philip. Fl. Pl. 1 (1924) 289.

Lateral lobes of the lip crescent-form, usually exceeding the middle lobe; middle lobe of the lip narrowly reniform to broadly so or even tending to become saggitate, apiculate.

LUZON, Rizal Province, *Loher 13562, 14613, 14620, 14622, 14634,* September, 1909: Laguna Province, Los Baños (Mt. Maquiling), *Elmer 18316,* June to July, 1917; San Antonio,

Bur. Sci. 16570 Ramos, September to October, 1912; mossy forest near summit of Mt. Irid, *Bur. Sci. 48484 Ramos* and *Edaño,* alt. 4,000 ft., November, 1926: without locality, *Serrato s.n.,* (type); "Philippine Islands," *Serrato s.n.,* September, 1912.

The only distinguishing character of value is the structure of the mid-lobe of the labellum. This structure is not constant and one specimen seen is about intermediate between the species and the variety. The mid-lobe of the labellum of the variety is usually shorter than the lateral lobes while in the species the reverse is the case.

20. DENDROCHILUM ASPERUM L. Wms., nom. nov.

Acoridium exasperatum AMES, Sched. Orch. 6 (1923) 21, *fig. 6,* non *Dendrochilium exasperatum* AMES.

Leaves linear-lanceolate to lanceolate, acute, often conduplicate and appearing short mucronate, short petiolate, 3.5 to 9 cm long, 0.3 to 0.6 cm broad, with 3 main veins, the lateral veins about 1 mm or more from the margin; inflorescence surpassing the leaves, slender and rather congested; bracts about 2 mm long; lateral sepals ovate-lanceolate, acute, about 1.5 to 2 mm long and 1 mm broad; petals broadly ovate acute, slightly unguiculate, 1.2 to 1.7 mm long, about 1 mm broad; lip 3-lobed, about 1 mm long, the lateral lobes falcate, obtuse, middle lobes deflexed, subquadrate apiculate or trilobulate with the middle lobule triangular acute, about as long as the lateral lobules.

LUZON, Rizal Province, *Loher 15042a;* on tree trunk in mossy forest, Mt. Lumutan, *Bur. Sci. 42338 Ramos* (type), alt. 4,000 ft., April, 1923: Laguna Province, Mt. San Cristobal, *Copeland 5601,* May, 1908.

Dendrochilum asperum is closely allied to both *D. curranii* and the var. *serratoi.* It is distinguished from these two entities by the structure of the sepals and petals and of the lip. Although these differences are not great it is thought best to retain it as a species awaiting further collections which it is hoped, will clarify its status.

21. DENDROCHILUM MINDANAENSE (Ames) L. Wms., comb. nov.

Acoridium mindanaense AMES, Orch. 6 (1923) 25, *fig. 6;* MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves linear, obtuse, (or minutely mucronate) 3 to 9 cm long, 2 to 2.5 mm broad, with 3 main nerves, the latter often obscure from above, not on the margin; inflorescence much surpassing the leaves; bracts about 2 mm long; lateral sepals

broadly lanceolate, acute, about 1.5 to 2 mm long and 0.75 mm broad; petals lanceolate, acute, 1.2 to 1.5 mm long, 0.4 to 0.5 mm broad; lip 3-lobed, the lateral lobes falcate, obtuse, about 0.5 mm long, middle lobe subquadrate, apiculate, subequal to or shorter than the lateral lobes.

MINDANAO, Agusan Province, Cabadbaran (Mt. Urdaneta), *Elmer 14095* (type), October, 1912.

This species is closely related to the following species. The type sheet and a duplicate specimen are all the material seen of this species.

22. DENDROCHILUM ABORTUM (Ames) L. Wms., comb. nov.

Acoridium abortum AMES, Blumea, Suppl. 1 (1937) 68.

Leaves linear, conduplicate at the apex, acuminate, 7 to 13 cm long, 2 to 3 mm broad, 3-nerved, the lateral nerves often obscure, not on the margin of the leaf; inflorescence up to 10 cm long, surpassing the leaves; bracts up to 2.5 mm long; lateral sepals broadly lanceolate, acute or acuminate, about 2 mm long and 1 mm broad; petals ovate-lanceolate, acute, up to 1.5 mm long, about 1 mm broad; lip 3-parted, the lateral divisions falcate, obtuse, about 0.7 mm long; middle division trilobulate and very small usually almost none.

LUZON, Rizal Province, without locality, *Loher 14690, 14694*, September, 1909.

The species is based on excellent material of which a great abundance is at hand. The striking feature of the species is the very poorly developed mid-lobe of the lip. This structure may be almost lacking and represented only by a thickening in the tissue where it should arise. The very apparent alliance of this species to *A. mindanaense* is very interesting when the distribution of other species of the genus is taken into account. The species, in so far as their ranges are known at present, seem to be very local as a rule. A few, *D. microchilum* and *D. tenellum* for example, are rather widely distributed. This species might be taken to be *D. mindanaense* under casual observation, and with reason, yet the two species are widely separated geographically as the Philippines go and as distribution in the section goes.

23. DENDROCHILUM RENIFORME Ames

Dendrochilum reniforme AMES, Orch. 5 (1915) 63.
Acoridium reniforme AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 289.

Leaves linear-lanceolate, obtuse, 6 to 12 cm long, 5 to 10 mm broad, with 3 main veins and often with two or more quite prominent, none on the margin of the leaf; bracts 2 to 2.5 mm long; lateral sepals lanceolate, acute or acuminate, 3.5 to 4 mm long, 1 to 1.4 mm broad; petals linear-lanceolate, about 3.5 mm long, about 0.75 mm broad; lip reniform, entire short apiculate, broader than long about 0.5 mm long and 1.5 mm broad, having a small sac under the column which is partly closed off above by 2 calli.

LUZON, Rizal Province, Mt. Canumay, *Bur. Sci. 13759 Ramos,* October, 1911: Laguna Province, back of San Antonio, *Calica s.n.,* February to March, 1913; *Bur. Sci. 20440 Ramos,* February, 1913.

The simple reniform lip of this species makes it easily distinguishable from the other small flowered species of the section.

The two Ramos specimens cited, have slightly narrower sepals than does the type.

24. DENDROCHILUM PULCHERRIMUM (Ames) L. Wms., comb. nov.

Acoridium pulcherrimum AMES, Orch. 7 (1922) 144; MERR., Enum. Philip. Fl. Pl. 1 (1924) 288.

Leaves narrowly elliptical, subacute, 9 to 11 cm long, 13 to 17 mm broad; with 3 main nerves, the two lateral ones on the margin of the leaf; inflorescence lateral, surpassed by the leaves, compact; lateral sepals oblong-elliptic, obtuse, about 4 mm long and 1.7 to 2 mm broad; petals elliptic, fimbriate, acute, slightly unguiculate, about 3.5 to 4 mm long and 1.5 mm broad; lip 3-lobed about 2.5 mm long, the lateral lobes linear acute, slightly sigmoid, the middle lobe half ovate, concave, surpassed by the lateral lobes.

LUZON, Benguet Subprovince, on tree, mossy forest slope, Mt. Natoo, *Bur. Sci. 45 Ramos* and *Edaño* (type), alt. 5,800 ft., September 30, 1921: Bontoc Subprovince, Mt. Poho, *Bur. Sci. 37683 Ramos* and *Edaño,* February, 1920.

This species and the following one, *D. smithianum,* are the most curious and interesting in the section due to lateral inflorescences.

25. DENDROCHILUM SMITHIANUM (Ames) L. Wms., comb. nov.

Acoridium smithianum AMES, Blumea Suppl. 1 (1937) 74.

Leaves elliptic, obtuse, 7 to 13 cm long, 12 to 17 mm broad, with 3 (or 5) main nerves, the two lateral ones on the margin;

inflorescence lateral, subequal to or shorter than the leaves, rather lax; lateral sepals lanceolate, acute, 3.5 to 3.7 mm long, about 1.5 mm broad; petals lanceolate, acute, fimbriate, 2.7 to 3.1 mm long, 0.7 to 1 mm broad; lip 3 parted, about 2.5 mm long, the lateral divisions linear, acute, slightly sigmoid, middle lobe half ovate, obtuse, concave, hardly 1 mm long, shorter than the lateral lobes.

LUZON, Rizal Province, Montalban, *Loher 12566a,* May, 1909; *Loher 13950, 15129,* January, 1913.

Dendrochilum smithianum is a second species of this section in which the inflorescence originates laterally from the pseudobulb. It is very similar in many respects to the other species with lateral inflorescence, *D. pulcherrimum,* and the relationship is no doubt very close. The leaves are approximately the same shape and are, in both species, marginate. Those of the present species are often 5-nerved and obtuse while those of the *D. pulcherrimum* are only 3-nerved and are quite acute. The inflorescence of *D. smithianum* is much more lax than in *D. pulcherrimum,* the flowers in the former are about 1.8 mm apart while those of the later are about 2 mm apart. The lax appearance of the inflorescence in *D. smithianum* is due to the shorter flowers, hardly of that length. The bracts of the *D. smithianum* are shorter than in *D. pulcherrimum* and all flower parts are smaller and comparatively narrower. So far as it is known the ranges of the two species are some 100 to 150 miles apart.

26. DENDROCHILUM MACGREGORII Ames.

Dendrochilum macgregorii AMES, Philip. Jour. Sci. § C 6 (1911) 42.
Acoridium macgregorii AMES, Orch. 7 (1922) 81, (as *Acoridium macgregorii*); AMES, Merr., Enum. Philip. Fl. Pl. 1 (1924) 286.
Dendrochilum macgregorii AMES, Orch. 7 (1922) 81, *sphalm.*

Leaves linear, acute, 5 to 14 cm long, 2 to 3 mm broad, with 3 main nerves, the lateral ones near (but not on) the margin; inflorescence shorter or subequal to the subtending leaf, rather lax; bracts 1 to 1.5 mm long; lateral sepals oblong lanceolate; acute, about 2 mm long and 1 mm broad; petals obovate, obtuse, about 2 mm long and 1.3 mm broad; lip entire, broadly obovate, short apiculate, about 1.2 mm long and 1 mm broad.

LUZON, Benguet Subprovince, Mt. Pulog, *Bur. Sci. 8849 McGregor* (type), July, 1909.

An easily distinguished and apparently rare species.

27. DENDROCHILUM FOXWORTHYI Ames.

Dendrochilum foxworthyi AMES, Orch. 3 (1908) 8, *t. 26.*
Acoridium foxworthyi AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves linear-oblong, obtuse, often apiculate, 6 to 18 cm long, 3 to 6 mm broad, with 3 main nerves, the lateral pair very near the margin of the leaf, often inconspicuous; inflorescence equal to or surpassing the leaves, rather lax; bracts 1.5 to 2 mm long; lateral sepals oblong-lanceolate, acute, slightly conduplicate at the apex, about 2 mm long and 1 mm broad; petals rhombic-ovate or obovate, about 2 mm long and 1 mm broad; lip simple oblong to oblong-ovate, slightly subcordate at the base, 1.2 to 1.5 mm long, about 1 mm broad.

LUZON, Ifugao Subprovince, in trees in mossy forest near Manhuyhuy, *Taylor 130,* alt. 2,000 m, May 15, 1920: Zambales Province, top of mountains on trees, Mt. Pinatubo, *Bur. For. 2542*[2] *Foxworthy* (Type).

It is interesting to note that *A. foxworthyi* has a very close counterpart in *A. purpureum* as to structure of the flowers. In the former species all parts are just about twice the size of those in the latter. Notwithstanding the similarity of structure the species are not thought to be particularly closely allied; the alliance seems rather to be with *A. rhombophorum.*

28. DENDROCHILUM RHOMBOPHORUM (Reichb. f.) Ames.

Dendrochilum rhombophorum (Reichb. f.) AMES, Orch. 3 (1908) 7.
Coelogyne rhombophora REICHB. f., Linnaea 41 (1877) 116.
Pholidota rhombophora REICHB. f., l. c. *in textu,* PFITZER and KRÄNZLIN, Engler's Pflanzr. IV. 50. II. B. 7 (1907) 153.
Acoridium whitfordii ROLFE ex. AMES, Orch. 1 (1905) 73.
Dendrochilum whitfordii PFITZ. and KRÄNZL., Engler's Pflanzr. IV. 50. II. B. 7 (1907) 162; AMES, Orch. 2 (1908) 100, *text cut.*
Acoridium rhombophorum (Reichb. f.) AMES, Sched. Orch. 5 (1923) 1.

Leaves linear-lanceolate to lanceolate, apex obtuse, often plicate and then appearing acute, 7 to 20 mm long, 8 to 13 mm broad, with 3 main nerves, the lateral pair near, but not on the margin; inflorescence subequal to or surpassing the leaves; bracts 1.5 to 2 mm long, lateral sepals oblong-ovate to ovate, usually obtuse, 1.5 to 2.5 mm long, 1.2 to 1.7 mm broad; petals rhombic to cuneate-ovate or flabelliform, obtuse, rarely

[2] "Specimens in Philippine National Herbarium, Manila, and in herb. Ames" fide Ames, Orch. 3 (1908) 9. It is probable that the illustration was prepared from the specimen in herb. Ames, which is here designated as type, the other now having been destroyed.

acute, 1.7 to 2.2 mm long, 1.6 to 2 mm broad; lip long, slightly pandurate, obscurely auriculate at the base, trilobulate at the apex or merely with a large triangular apiculation, 1.2 to 1.7 mm long, 0.8 to 1 mm broad.

LUZON, Bataan Province, *Bur. For. 6516 Curran,* April 7, 1907; Lamao River, Mt. Mariveles, *Whitford 139* (type *A. whitfordii*), May, 1904; Mt. Mariveles, *Topping 360,* 1904: Rizal Province, *Loher 15040;* Mt. Lumutan, *Bur. Sci. 42334 Ramos,* April, 1923: Manila, *Wallis* [3] *s.n.*, alt. 7,200 ft.: Laguna Province, Mt. Banahao, *Bur. Sci. 27935 Ocampo,* May, 1917; *Loher 13679,* March, 1915; on tree trunks, Majayjay, *Bur. Sci. 49988 Rivera* and *Duyag,* alt. 4,000 ft., June, 1928: Quezon (Tayabas) Province, Lucban, *Elmer 7395, 7679,* May, 1907; Mt. Binguan, *Bur. Sci. 28619, 28620 Ramos* and *Edaño,* alt. 500 m, May 27, 1917. MINDANAO, Surigao Province, Lake Mainit, *Loher 14564,* June, 1909.

This species, which was orginally published as *Coelogyne rhombophora,* remained a puzzle from the time it was published until the Reichenbachian herbarium was opened and a study has been made of his material. In the meantime the species was redescribed by Rolfe as *Acoridium whitfordii.*

The distribution of this species, as far as it is known is quite odd. Most of the known collections are in a relatively small area in Luzon with an outlying station on the east coast of Mindanao.

29. DENDROCHILUM UNICORNE (Ames) L. Wms., comb. nov.

Acoridium unicorne AMES, Orch. 7 (1922) 145; MERR., Enum. Philip. Fl. Pl. 1 (1924) 290.

Leaves narrowly elliptic-lanceolate, obtuse, usually slightly conduplicate at the apex thus appearing mucronate, 4 to 10 mm long, 6 to 10 mm broad, with 3 main nerves, the lateral pair near the margin; inflorescence equaling or surpassing the leaves, bracts 2 to 2.5 mm long; lateral sepals ovate-lanceo-

[3] There is in herb. Ames a tracing of this species which is said to have been made by R. Schlechter from Herb. Reichenbach f. This tracing contains the outline of a plant and five analytical sketches, probably those of Reichenbach. Later Ames, in transferring the species to *Acoridium* said, "In my herbarium there is a specimen from the original Wallis Collection, for which I am indebted to the Director of the Botanische Abteitung des Naturhistorischen Museums, Vienna."

It is a peculiar fact that the above mentioned tracing from Herb. Reichenbach f. is from the plant now in Herb. Ames.

late, slightly conduplicate at the apex, thus acute, about 3 mm long and 1.7 mm broad; petals linear-lanceolate to lanceolate, slightly acuminate, acute, minutely serrulate above, about 2.5 mm long and 0.7 to 1 mm broad; lip simple, oblong pandurate inconspicuously bilobed at the base, acute at the apex, with an uncinate callus which extends back over the cavity at the base of the column.

LUZON, Benguet Subprovince, mossy forest, Mt. Simakoko, *Bur. Sci. 43a, Ramos* and *Edaño,* alt. 6,500 ft., October 5, 1921; epiphyte in mossy forest, *Bur. Sci. 54 Ramos* and *Edaño* (type) alt. 6,500 ft., October 6, 1921.

The uncinate callus on the lip of this species gives it a most distinctive character. *D. unicorne* is apparently most nearly allied to *D. rhombophorum* which it resembles both in facies and morphology of the flower.

30. DENDROCHILUM OCELLATUM (Ames) Pfitzer

Dendrochilum ocellatum (Ames) PFITZER, Engler's Pflanzr. IV. 50. II. B. 7 (1907) 117, *fig. 38c;* AMES, Orch. 2 (1908) 12, 101, *t. 23, fig. II, 2.*

Acoridium ocellatum AMES, Biol. Soc. Wash. Proc. 19 (1906) 151; MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves linear-oblong, obtuse 4 to 7 cm long, 4 to 6 mm broad, often with only the mid-nerve prominent, or with 3 nerves prominent, the lateral pair not on the margin; inflorescence subequal to or surpassing the leaves, few-flowered, quite dense; bracts about 3 mm long; lateral sepals oblong-ovate, obtuse, ocellate about 2.5 mm long and about 1 mm broad; petals elliptic-ovate, obtuse, ocellate, about 2 mm long and 1 mm broad; lip simple, broadly reniform-ovate, the apex obtuse, subtriangular.

LUZON, Lepanto Subprovince, Mt. Data, *Merrill 4481a* (Dupl. type and analytical drawings from type which was in Philippine National Herbarium, Manila), November, 1905; *Bur. Sci. 7 Ramos* and *Edaño,* October 9, 1921.

A most distinct species probably most closely allied to *D. obliganthum.* It is the only known species which has ocelli on the sepals and petals and may be easily distinguished by them.

31. DENDROCHILUM OLIGANTHUM (Ames) Pfitzer

Dendrochilum oliganthum (Ames) PFITZER, Engler's Pflanzr. IV. 50. II. B. 7 (1907) 117, *fig. 38 E;* AMES, Orch. 2 (1908) 12, 98, *t. 23, fig. IV, 4.*

Acoridium obligathum AMES, Biol. Soc. Wash. Proc. 19 (1906) 150; MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves oblanceolate, obtuse, 1.5 to 3 cm long, 4 to 6 mm broad, with 3 or more prominent veins, the lateral pair not on the margin; inflorescence surpassing the leaves, few-flowered; bracts about 2 mm long; lateral sepals suborbicular, broader than long, obtuse, about 2 mm long and 2.5 mm broad; petals broadly cuneate-obovate, obtuse or subacute, about 2 mm long and 2 mm broad; lip 3-lobed, triangular in outline, about 1.2 mm long and 1.5 mm broad; lateral lobes explanate; the mid-lobe often abruptly narrowed to a point.

LUZON, Lepanto Subprovince, Mt. Data, *Merrill 4481*, October 20, 1905; Mt. Sinapsapan, *Bur. Sci. 35 Ramos* and *Edaño*, October, 1921.

This is the smallest known species of the section. It is unique in the structure of the flowers; the nearest ally is probably *D. ocellatum*.

32. **DENDROCHILUM PURPUREUM** Ames

Dendrochilum purpureum AMES, Orch. 6 (1920) 286.
Acoridium purpureum AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 288.

Leaves linear-elliptic acute, attenuated at both ends, 3 to 20 cm long (usually about 15 cm) of which about one-third is petiole, 0.5 to 2 cm broad, usually with 5 to 7 main nerves which may be very faint; inflorescence rather lax, surpassing the leaves; bracts about 2 mm long; lateral sepals lanceolate, acute, about 4 to 5 mm long, 1.5 to 2 mm broad; petals cuneate-ovate, 3 to 4.5 mm long and 2 to 2.8 mm broad; lip simple, entire, trulliform, 2 mm long, 1 mm broad.

LUZON, Apayao Subprovince, Mt. Pasoan, *Boettcher s.n.*, alt. 1,000 m, July 19, 1918.

Perhaps most closely allied to *D. turpe* but the structure of the lip is simpler.

33. **DENDROCHILUM URCIFORME (Ames) L., Wms., comb. nov.**

Acoridium urciforme (Ames) in Blumea Suppl. 1 (1937) 76.

Leaves narrowly elliptic, obtuse, including the petiole, 12 to 17 cm long, 9 to 12 mm broad, with 3 to 5 prominent nerves, the lateral ones not marginate; inflorescence subequal to the leaves, compact; bracts about 3 mm long; lateral sepals broadly lanceolate, about 4 mm long and 1.5 broad; petals broadly lanceolate, acute, 3.5 mm long and 1.3 mm broad; lip entire, broader than long, subreniform, 1 mm long, 2 mm broad, in natural position shaped much like the lip of a pitcher.

LUZON, Rizal Province, Mt. Paminglingan, Montalban, *Loher 13276* (type), April, 1912.

This species is closely allied to *D. turpe*, from which it may be distinguished by its much narrow perianth parts. *D. turpe* has minute lateral lobes on the lip, the present species has none. In general the lip of this species is urceolate, while that of *D. turpe* is more explanate.

34. DENDROCHILUM OREOPHILUM (Ames) L. Wms., comb. nov.

Acoridium oreophilum AMES, Blumea Suppl. 1 (1937) 71.

Caespitose epiphytic herbs up to 15 cm tall. Leaves elliptic-lanceolate, obtuse, 9 to 11 cm long, 7 to 11 mm broad, with 3 prominent veins, the lateral pair not on the margin; inflorescence subequal to or shorter than the subtending leaf; bracts about 2 to 2.5 mm long; lateral sepals broadly lanceolate, acute, about 3.5 mm long and 1.3 mm broad; petals lanceolate, acute, about 3 mm long and 1 mm broad; lip 3–lobed, about 0.8 mm long and 1.5 mm broad (when flatened out), the lateral lobes oblong falcate, shorter than the transversely-oblong apiculate middle lobe; in natural position the lateral lobes of the lip are much less conspicuous and the lip is saccate under the column.

LUZON, Rizal Province, without date or exact locality, *Loher 15042* (type).

This species seems to have its affinity with *D. urciforme* but may be easily distinguished from that by its 3-lobed lip. Further material is needed to place this species more accurately within the genus.

35. DENDROCHILUM TURPE (Ames) Pfitzer

Dendrochilum turpe (Ames) PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 118, *fig. 38 D;* AMES, Orch. 2 (1908) 12–98, *t. 23, fig. III, 3.*

Acoridium turpe AMES, Biol. Soc. Wash. Proc. 19 (1906) 149; MERR, Enum. Philip. Fl. Pl. 1 (1924) 290.

Leaves, linear-elliptic, the blade attenuated at both ends, 8 to 28 cm long, the blade about $\frac{3}{5}$ of this length, 0.7 to 2 cm broad, usually with only 3 or 5 prominent veins, the outside pair marginate; inflorescence equaling or surpassing the leaves, rather lax but strict; bracts 3.5 to 4.5 mm long; lateral sepals ovate-lanceolate to ovate, 3.5 to 4 mm long, 2.5 to 3.2 mm broad, petals broadly ovate-rhomboid, about 4 mm long and 2.5 mm broad; lip 3-lobed, the lateral lobes inconspicuous, minute, rounded, basal, the middle lobe large semi-orbicular carinate about 1.5 mm long and 2 mm broad.

LUZON, Benguet Subprovince, Suyoc to Pauai, *Merrill 4758* (isotype), November 7, 1905; epiphyte mossy forest slope, Mt. Pulogloco, *Bur. Sci. 30 Ramos* and *Edaño,* alt. 6,800 ft., September 30, 1921; epiphyte in mossy forest, Mt. Simakoko, *Bur. Sci. 42 Ramos* and *Edaño,* alt. 6,200 ft., October 5, 1921.

An interesting and easily distinguishable species, allied on one hand probably to *D. purpureum* and on the other to *D. marginatum.*

36. DENDROCHILUM MARGINATUM (Ames) L. Wms., comb. nov.

Acoridium marginatum AMES, Sched. Orch. 6 (1923) 23, *fig. 5.*

Leaves oblong-lanceolate, obtuse, mucronate, 6 to 12 cm long, 8 to 11 mm broad, with 3 main nerves, the lateral ones marginate; inflorescence surpassing the leaves, raceme tortulose; bracts 2.5 to 3 mm long; lateral sepals ovate-lanceolate, obtuse, about 4 mm long and 2.5 mm broad; petals flabellate, about 4 mm long and as broad above the middle; lip 3-lobed, pandurate 2 mm long, about 1 mm broad, the lateral lobes small, basal, the large middle lobe semi-obovate.

LUZON, Rizal Province, on tree near summit, Mt. Irig, *Ramos s.n.* (type), alt. 4,900 ft., April 19, 1922.

The shape of the lip in this species rather reminds one of many species of § *Platyclinis* of *Dendrochilum.* The relationship is probably to the preceding species however. Not easily to be confused with any other species of the section by reason of the lip and flabelliform petal in conjunction with distinctly marginal leaves.

37. DENDROCHILUM PHILIPPINENSE (Ames) Pfitzer

Dendrochilum philippinense (Ames) PFITZER, Engler's Pflanzr. IV. 50. II. B. 7 (1907) 118, *fig. 38 F;* AMES, Orch. 2 (1908) 12, 97, *t. 23, fig. V, 5;* Philip. Jour. Sci. § C 4 (1909) 595.

Acoridium philippinense AMES, Biol. Soc. Wash. Proc. 19 (1906) 149; MERR., Enum. Philip. Fl. Pl. 1 (1924) 288.

Leaves linear-lanceolate to oblong-lanceolate, obtuse or acute, 9 to 23 cm long, 11 to 30 mm broad, with 3 to 9 main nerves, the outermost pair very near or even on the margin of the leaf; inflorescence usually much surpassing the leaves; bracts 2.5 to 4 mm long; lateral sepals lanceolate to oblong-lanceolate, 3.5 to 6 mm long, 1.5 to 2.2 mm broad; petals rhombic-ovate, acute or rarely somewhat acuminate, 3 to 5 mm long, 1.5 to 3 mm broad; lip 3-lobed, the lateral lobes linear, crescent-shaped, narrower and usually much shorter than the oblong-trulliform carinate middle lobe.

LUZON, Benguet Subprovince, *Clemens 16318,* December, 1925; *Bur. For. 15769 Curran* and *Merritt,* December, 1908; Suyoc to Pauai, *Merrill 4757* (dupl. type), November 7, 1905; epiphyte in mossy forest, Mt. Boadan, *Bur. Sci. 13 Ramos* and *Edaño,* alt. 6,860 ft., September 26, 1921: Lepanto Subprovince, *Demme 5725,* November 19, 1906; epiphyte in mossy forest, Mt. Data, *Bur. Sci. 3 Ramos* and *Edaño,* alt. 7,630 ft., September 22, 1921, epiphyte, *Bur. Sci. 26 Ramos* and *Edaño,* alt. 7,330 ft., September, 1921, *Bur. Sci. 34 Ramos* and *Edaño,* October 10, 1921; epiphyte in mossy forest, Mt. Rangualitikai, *Bur. Sci. 36 Ramos* and *Edaño,* alt. 6,000 ft., October 13, 1921; Mt. Simakoko, *Bur. Sci. 41 Ramos* and *Edaño,* alt. 6,000 ft., October 6, 1921: Ifugao Subprovince, Mt. Polis *McGregor 19875,* February, 1913: Bontoc Subprovince, *Vanoverbergh 1051,* January, 1911, on trees, *Vanoverbergh 2420,* alt. 1,750 m, January 11, 1913.

Dendrochilum philippinense is, as far as known, not very widely distributed but it is interesting. The peculiar lip and general facies of the plant do not permit its confusion with any other species. Within the species there is considerable variation, mainly as to size. The Curran and Merritt specimen, cited above, has exceedingly small flowers, unusual enough so that Ames wrote additional description of the species when the specimen was received. However it is believed that this is merely the extreme known variation of the species and not worthy of name.

38. **DENDROCHILUM VANOVERBERGHII** Ames

Dendrochilum vanoverberghii AMES, Philip. Jour. Sci. § C 7 (1912) 27.

Acoridium vanoverberghii AMES, Orch. 7 (1922) 82; MERR., Enum. Philip. Fl. Pl. 1 (1924) 290.

Leaves linear, flat, acute, 5 to 8 cm long, 2 to 3 mm broad, only the mid-vein conspicuous; inflorescence much surpassing the leaves, lax; bracts about 2.5 mm long; lateral sepals lanceolate to ovate-lanceolate, acute, about 2.5 mm long and 1.2 mm broad; petals narrowly lanceolate, obtuse about 2.2 mm long and 0.8 mm broad; lip 3-lobed, about 1.5 mm long, lateral lobes rotund, obtuse; mid-lobe subquadrate, shallowly tri-lobulate, or apiculate, subequal to the lateral lobes, when lip is spread out.

LUZON, Ifugao Subprovince, Mt. Polis, *Bur. Sci. 19893 McGregor,* February, 1911: Bontoc Subprovince, *Vanoverbergh 1046* (type),[4] November to December, 1910.

D. vanoverberghii is closely allied to *D. exile* but is easily distinguished from that species by the lip and differently shaped petals as well as the shorter leaves.

39. DENDROCHILUM EXILE Ames

Dendrochilum exile AMES, Philip. Jour. Sci. § C 2 (1907) 317; nomen subnudlum, Orch. 2 (1908) 84, *text cut.*
Acoridium exile AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves linear, flat, acute, 7 to 15 cm long, up to 2.5 mm broad, with only the mid vein prominent; inflorescence rather lax, anfractuose, anthesis from apex toward base, equal the subtending leaf but shorter than old leaves, the peduncle free from the leaf; bracts about 2.5 mm long; lateral sepals oblong-lanceolate, about 3.2 mm long and 1.5 mm broad; petals ovate to rhombic-ovate, about 2.5 mm long and 2 mm broad; lip 3-lobed, about 1 mm long, the lateral lobes oblong-falcate, obtuse, the mid-lobe broadly triangular, subequal to the lateral lobes, trilobulate, the lateral lobules explanate (when opened out) or deflexed (in natural position), apical lobule triangular

MINDORO, Mt. Halcon, *Merrill 5721* (dupl. type, specimen from which figure was made), November 15, 1906.

A distinct and rare species known only from the type locality, probably most closely allied to the following species. The species was compared in habit as a connecting link between *D. gramifolium* and *D. tenuifolium* by Ames. While this is true as to vegetative structure the species is probably not closely related to either of those species as a comparison of flower structure will show.

40. DENDROCHILUM PUMILUM Reichb. f.

Dendrochilum pumilum REICHB. f., Bonpl. 3 (1855) 222; PFITZER and KRANZLIN, Engler's Pflanzenr. IV. 50. II B. 7 (1907) 162; AMES, Orch. 2 (1908) 93, *text cut,* 3 (1908) 61; Philip. Jour. Sci. § C 4 (1909) 596.

[4] There are two sheets of this collection in the Ames Herbarium. On one of these sheets is the note "Specimen from type sheet in Herb. Bureau of Science." In so far as there is no certain specimen designated as type nor is the herbarium in which it is contained designated, the *Vanoverbergh* specimen bearing herb. no. *12171* in the Ames Herbarium is here designated as type.

Coelogyne pumila (Reichb. f.) WALP., Ann. 6 (1861) 236.
Acoridium pumilum (Reichb. f.) ROLFE, Orch. Rev. 12 (1904) 220; AMES, MERR., Enum. Philip. Fl. Pl. 1 (1924) 288.

Leaves lanceolate to elliptic-lanceolate, acute or usually acuminate, 5 to 12.5 cm long, 5 to 15 mm broad, 3 to 5 nerved, the lateral nerves often obscure, the outer two near or on the margin; inflorescence usually surpassed by the leaves, rather lax; bracts 3 to 4 mm long; lateral sepals ovate-lanceolate, 4.5 to 6 mm long, 2 to 3 mm broad; petals obovate to orbicular, often slightly unguiculate, minutely crenulate, 4 to 6 mm long, 3 to 4 mm broad; lip 3–lobed, the lateral lobes falcate to semiovate, obtuse, middle lobe subquadrate, apiculate, subequal to the lateral lobes.

LUZON, "Philippines," *Cuming 2102* (a tracing of the type and analysis in Herb. Reichb. f. prepared by Schlechter—a tracing of the same collection in Herb. Brit. Mus. prepared by Rendle); Laguna Province, Mt. Maquiling, *Brown 17247,* December 28, 1912; *Merrill 6289, 6291,* February, 1909; *Bur. Sci. 17087 Robinson,* December 6 to 9, 1912; *Bur. Sci. 17320 Robinson* and *Brown,* February, 1913; Mt. Banajao, *Bur. For. 8019, 8021, 8023, 8031 Curran* and *Merritt,* alt. 1,400 to 2,000 m, November 10, 1907: Quezon (Tayabas) Province, Mt. Banajao, *Bur. For. 948 Whitford,* October 19, 1904.

This species, has been surrounded by much confusion and has received considerable attention in literature. Pfitzer and Kränzlin relegated it to "Species dubiae haud satis notae" in their treatment of the Coelogyninae for "Das Pflanzenreich." For this they were promptly taken to task by Ames who called attention to the fact that there was a specimen of the collection on which the species was based in the British Museum of Natural History. In Ames, Orch. 2 (1908) 94, a drawing made from a flower from this collection was published. Since that time the Reichenbachian herbarium has been unsealed and a sketch of the habit and floral analysis have been seen. These sketch and analysis leave no doubt that the species had been correctly interpreted by Ames at the earlier date.

According to Dr. E. D. Merrill, Cuming probably got the type specimen from Mt. Banajao. Whether or not he was on Mt. Maquiling is not sure. The species is known definitely only from those two mountains. The Foxworthy specimen from Lamao Forest reserve, cited by Ames, ibid., is in poor condition but is probably not this species.

41. DENDROCHILUM AFFINE Ames

Dendrochilum affine AMES, Orch. 2 (1908) 95, *text cut.*
Acoridium affine AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 284.

Leaves lanceolate, acute or obtuse, 4 to 9 cm long, 4 to 9 mm broad, with 3 or 5 main nerves, the lateral ones not marginate; inflorescence surpassing the subtending leaves, shorter than the mature leaves; bracts 2.5 to 3.5 mm long; lateral sepals lanceolate to bradly lanceolate, (acute ? or) obtuse, 3.5 to 4.5 mm long, 1.5 to 1.8 mm broad; petals oblong-ovate to ovate, obtuse 3.5 to 4.5 mm long, 2 to 2.6 mm broad; lip 3-lobed, about 2 mm long, lateral lobes oblong, more or less falcate, obtuse, about 1 mm long; midlobe subsaggitate, the lobules adjacent to the sinus, rather inconspicuous, much surpassing the lateral lobes in length.

LUZON, Bataan Province, Lamao River, Mt. Mariveles, *Merrill 3218* (type), October, 1903; Mt. Mariveles, *Bur. Sci. 5184 Topping;* on ridge leading to Mt. Lamao River, *Whitford 1354,* alt. 3,400 ft., September, 1905.

This species is very closely allied to *D. pumilum,* but on the basis of extant material seems to be sufficiently distinct.

The distribution of *D. pumilum* and *D. affine* are of interest when taken in conjunction. The former is known only from Mts. Maquiling and Banajao, the latter from Mt. Mariveles and vicinity. A few species of wider range occurring in the general region inhabit both groups of mountains and do not occur in between.

42. DENDROCHILUM CINNABARINUM Pfitzer

Dendrochilum cinnabarinum PFITZER, Engler's Pflanzenr. IV. 50. II. B. 7 (1907) 104, *fig. 35F,* except as to lip; AMES, Orch. 2 (1908) 8, *footnote 2;* AMES, Orch. 3 (1908) 10, *t. 27, figs. II, B. b.*
Acoridium cinnabarinum (Pfitz.) AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves linear-lanceolate, acute, 5 to 15 cm long, 3 to 7 mm broad, with 3 prominent nerves, the lateral pair very near the margin of the leaf; inflorescence surpassing the leaves, at least the subtending leaves; bracts 3 to 3.5 mm long; lateral sepals rhombic-ovate, obtuse 3.5 to 4 mm long, about 3 mm broad; petals rhombic-orbicular, long acuminate, about 3.5 mm long and about 2.5 mm broad; lip 3-parted, distinctly saccate, about 2 mm long, the lateral lobes oblong-falcate, obtuse, about 1 mm long, middle lobe hastate, about 2 mm long.

LUZON, Benguet Subprovince, epiphyte in mossy forest, Mt. Simakoko, *Bur. Sci. 43 Ramos* and *Edaño,* alt. 6,500 ft., October 5, 1921.

This was first described in *Dendrochilum* subgenus *Platyclinis,* by Pfitzer and figured as having a fairly typical *Platyclinis* lip. Ames promptly called attention to this error and to the implied error that the column had the *Platyclinis* type of arms. In Orch. 3 (1908) he further clarified the species by publishing a figure made from a duplicate of the type collection and by giving a redescription of the plant.

In the following years five more collections were received, which were referred to this species, and cited in publications; however, on critical study four of these collections were found to belong to a closely related species which follows.

43. DENDROCHILUM SANGUINEUM (Ames) L. Wms., comb. nov.

Acoridium sanguineum AMES, Blumea Suppl. 1 (1937) 72.

Leaves linear-lanceolate, acute, 4 to 15 cm long, 3 to 7 mm broad, with 3 prominent nerves, the lateral pair near the margin; inflorescence surpassing the leaves, rather lax; bracts 2.5 to 3.5 mm long; lateral sepals broadly ovate, obtuse, 4 to 4.5 mm long, 3 to 4 mm broad; petals narrowly rhombic-ovate, acute or acuminate, 3.5 to 4 mm long, about 2.5 mm broad; lip 3-lobed, about 2 mm long, lateral lobes triangular-arcuate, acute or obtuse, about 1 mm long, mid-lobe ligulate, entire, strongly refracted, about 1 mm long.

LUZON, Benguet Subprovince, Mt. Pulog, *Boettcher s.n.* (type in Herb. Ames), June, 1918; on tree, *Bur. For. 16348 Curran, Merritt* and *Zschokke,* alt. 8,800 ft., January, 1909; *Bur. Sci. 8844 McGregor,* July, 1909; mossy forest, *Merrill 6475,* alt. 7,500 ft., May, 1909.

This species is very closely allied to *D. cinnabarinum,* from which it differs mainly in the structure of the lip. The lip of the present species, in contrast to the other one, is much less saccate, has larger lateral lobe; has a ligulate deflexed mid-lobe in contrast to a hastate one. Superficially the species is so similar in aspect that it is quite impossible to distinguish it from *D. cinnabarinum.*

44. DENDROCHILUM SCHWEINFURTHIANUM (Ames) L. Wms., comb. nov.

Acoridium schweinfurthianum (Ames) in Blumea, Suppl. 1 (1937) 73.

Leaves elliptic-oblong, obtuse, the mid lobe often produced into a mucro, 5 to 8 cm long, 1 to 2.3 cm broad, with 3

(rarely 5 or 7) prominent veins, the lateral pair marginate; inflorescence surpassing the leaves, lax, terminal, with the raceme about 8 mm long; bracts of the inflorescence round, glume-like conspicuously nerved, about 2 mm long and 2 to 2.5 mm broad; lateral sepals triangular-lanceolate, acute 1-nerved, about 3 mm long and 1.5 to 2 mm broad; dorsal sepal elliptic-oblong, obtuse or acute, about 4 mm long and 1.3 mm broad; petals rhombic-ovate, obtuse, 1-nerved, upper half erose, about 3.5 mm long and 2 mm broad; lip 3-lobed, about 1.5 mm long and 2 mm broad (when spread out); lateral lobes oblong falcate, obtuse; middle lobe triangular, subacute, slightly saccate in the disc, near the sinuses of the lateral lobes there is a mammilate calluis and in the middle of the labellum there is a callus or papilla.

LUZON, Rizal Province, Mt. Tokduanbanoy, on tree tops, mossy forest, *Bur. Sci. 48602 Ramos* and *Edaño* (type), alt. 4,000 ft., November 26, 1926.

This species is most closely allied to *D. mindorense*, from which it is amply distinct both in the flower, particularly in the shape of the petals and sepals, and in the structure and venation of the leaves.

45. DENDROCHILUM MINDORENSE Ames

Dendrochilum mindorense AMES, Philip. Jour. Sci. § C 2 (1907) 317, nom. nud., Orch. 2 (1908) 91, *text cut.*

Acoridium mindorense AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves lanceolate, obtuse, 7 to 19 cm long, 1 to 2.5 cm broad, with 5 or 7 main nerves, the 2 lateral ones not on the margin; inflorescence dense, contracted, surpassing the subtending leaf, surpassed by the mature leaves; bracts about 3.5 mm long; lateral sepals lanceolate, acute, 4.5 to 5 mm long, 2 mm broad; petals ovate-rhomboid, obtuse 4 to 4.5 mm long about 2.5 mm broad; lip 3-lobed, the lateral lobes oblong-falcate, obtuse, middle lobe cuneate-triangular, obtuse, minutely lobulate at either side near the base, equal the lateral lobes in length.

MINDORO, Mt. Halcon, *Merrill 5729, 5795* (type), November, 1906.

A peculiar species possibly allied to *D. recurvum* more closely than to any other species except *D. tenuibulbum.*

The figure in Orch. 2 (1908) 91, shows the middle lobe of the lip a little too broad and not obtuse enough.

46. DENDROCHILUM TENUIBULBUM (Ames) L. Wms., comb. nov.

Acoridium tenuibulbum AMES, Blumea Suppl. 1 (1937) 75.

Leaves lanceolate, acuminate, acute, 12 to 18 cm long, 18 to 25 mm broad, with 5 main nerves, the lateral pair not on the margin; inflorescence lax, elongated, subequal to or surpassing the subtending leaf; bracts about 3 mm long; lateral sepals oblong-lanceolate, acute, about 3 mm long and 1.3 mm broad; petals obovate, obtuse (or slightly acute), often slightly crenulate, about 2.8 mm long and 1.8 mm broad; lip 3-lobed, about 1.5 mm long and 2 mm broad when spread out; lateral lobes oblong-arcuate, obtuse, about 1.5 mm long; middle lobe subequal the lateral lobes, subquadrate, but long obtuse-apiculate.

LUZON, Rizal Province, Balacbac, *Loher 13046* (type), May, 1916; Montalban, *Loher 13144*, April, 1915.

Dendrochilum tenuibulbum is closely allied to *D. mindorense* but may be contrasted with that species in the following way:

1. The inflorescence of *D. mindorense* is dense and the peduncle is short in comparison to the present species.

2. The pseudobulbs are shorter and much thicker than in *D. tenuibulbum.*

3. The leaves are obtuse in *D. mindorense* while in the present species they are acuminate and acute.

4. The bracts, petals, sepals and lip of *D. mindorense* are very similar in shape to those of the present species but each part is considerably larger than in *D. tenuibulbum.*

It is to be admitted that *D. mindorense* is very closely related to the present species and that when more material is available they may prove to be the same.

47. DENDROCHILUM RECURVUM Ames

Dendrochilum recurvum AMES, Philip. Jour. Sci. § C 2 (1907) 318; PFITZER and KRÄNZLIN, Engler's Pflanzenr. IV. 50. II, B. 7 (1907) 117; *fig. 33T;* AMES, Orch. 2 (1908) 12, 90, *t. 22, fig. IV, 4.*

Acoridium recurvum AMES, Biol. Soc. Wash. Proc. 19 (1906) 148; MERR., Enum. Philip. Fl. Pl. 1 (1924) 289.

Leaves linear-lanceolate to elliptic-lanceolate, acuminate, 9 to 17 cm long, 8 to 19 mm broad, with 3 (or 5) prominent nerves, the lateral nerves not on the margin; inflorescence about equaling the leaves in length, lax; bracts about 3.5 mm long; lateral sepals oblong-ovate, 3.2 to 4.2 mm long, 2 to 2.5 mm broad; petals obovate to suborbicular, slightly erose, 3 to 4 mm long, 2.2 to 2.7 mm broad; lip 3-lobed, 1.2 to 2 mm long, lateral lobes falcate, usually surpassing the quadrate apiculate mid-lobe in length.

LUZON, Lepanto Subprovince, Mt. Data, *Merrill 4584* (dupl. type), November, 1905; epiphyte in mossy forest, Mt. Data, *Bur. Sci. 2, 4 Ramos* and *Edaño,* alt. 7,630 ft., September 21 to 22, 1921; *Bur. Sci. 27 Ramos* and *Edaño,* alt. 7,630 ft. September 24, 1921: Benguet Subprovince, epiphyte in mossy forest, Mt. Pulogloco, *Bur. Sci. 23 Ramos* and *Edaño,* alt. 6,700 ft., September 30, 1921: Rizal Province, *Loher 14598,* September, 1909.

MINDORO, Mt. Halcon, *Merrill 5509, 5831,* alt. 8,200 ft., November 20, 1906.

An interesting species closely allied to *Dendrochilum pumilum,* but having consistently smaller flowers, larger leaves, a strict raceme and a loose, non-caespitose habit. The specimens from Mindoro seem in no way different from those of Luzon.

48. DENDROCHILUM LONGIBULBUM Ames

Dendrochilum longibulbum AMES, Philip. Jour. Sci. § C 7 (1912) 26.
Dendrochilum lucbanense AMES, Elm., Leafl. Philip. Bot. 5 (1912) 1559.
Acoridium longibulbum AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 286.
Acoridium lucbanense AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1922) 286.

Leaves linear to linear-lanceolate, acute or obtuse, the midnerve often produced into a short mucro, 4 to 14 cm long, 3 to 14 mm broad, with 1 or usually 3, rarely 5, prominent nerves, the lateral pair not on the margin; inflorescence various but usually surpassing the subtending leaf; bracts 2.5 to 3.5 mm long; lateral sepals lanceolate to broadly lanceolate, acute, 2.5 to 3.5 mm long, 1.2 to 1.5 mm broad; petals oblong-ovate to rhombic-obovate, acute, or obtuse, 2 to 3 mm long, 1.2 to 1.8 mm broad; lip 3-lobed, about 1 to 1.2 mm long; lateral lobes oblong-arcuate, obtuse, about 0.7 mm long; middle lobe subquadrate, apiculate, or sometime trilobulate at the apex, subequal or surpassing (usually considerably) the lateral lobes.

LUZON, Ifugao Subprovince, Mt. Polis, *Bur. Sci. 19892 McGregor,* February, 1913: Lepanto Subprovince, Mt. Data, *Bur. Sci. 25 Ramos* and *Edaño,* October, 1921; epiphyte in mossy forest, *Bur. Sci. 37 Ramos* and *Edaño,* alt. 7,630 ft., September 22, 1921; epiphyte, *Bur. Sci. 46 Ramos* and *Edaño,* alt. 7,630, September 23, 1921: Bontoc Subprovince, *Vanoverbergh 3830,* August to September, 1910: Quezon (Tayabas) Province, Lucban, *Elmer 7571* (type), May 1907: Rizal Province, *Loher s.n.* (Philip. Nat. Herb., Manila), September, 1909; *Loher 14619,* September, 1909.

Dendrochilum longibulbum seems to belong in a complex group of species which are allied to *D. recurvum*. When more material is available it may be necessary to rearrange the species in the group.

Dendrochilum lucbanense seems not to be distinct from *D. longibulbum* on consistant characters.

49. DENDROCHILUM SIMULACRUM Ames

Dendrochilum simulacrum AMES, Orch. 2 (1908) 92, *text cut.*
Acoridium simulacrum AMES, Orch. 7 (1922) 82; MERR., Enum. Philip. Fl. Pl. 1 (1924) 289.

Leaves lanceolate, short petiolate, obtuse but often short mucronate, 6 to 9 cm long, 8 to 12 mm broad, with 3 main veins, the laterals not marginate; inflorescence surpassing the subtending leaf, equal to the older ones; bracts about 4 mm long; lateral sepals oblong-ovate, about 3 mm long, about 2 mm broad; petals ovate-orbicular, slightly unguiculate, about 3 mm long, 2 mm broad; lip 3-lobed, lateral lobes falcate, acute, middle lobe subquadrate, retuse, apiculate, shorter than the lateral lobes, decidedly saccate, the sac about 1 mm deep.

LUZON, Benguet Subprovince, on trees, top of Mt. Tonglon, *Bur. For. 4981 Curran* (type), August 8, 1906.

Dendrochilum simulacrum seems to be the terminal species in a series of a small group starting with *D. purpureum*, which has essentially a simple slightly concave lip, to this species which has a rather highly modified 3-lobed lip which is definitely saccate.

The type specimen, collected in 1906, is to date the only specimen that can definitely be referred to this species.

50. DENDROCHILUM EXIMUM (Ames) L. Wms., comb. nov.

Acoridium eximium AMES, Blumea Suppl. 1 (1937) 70.

Leaves elliptic-lanceolate, obtuse, 7 to 11 cm long, 6 to 13 mm broad, with 3 or 5 main nerves, the lateral pair near but not on the margin; inflorescence surpassing the leaves, rather compact; bracts about 3.5 to 4 mm long; lateral sepals broadly lanceolate, acute or acuminate, about 4.5 mm long and 2 mm broad; petals broadly lanceolate, acute or acuminate, about 4 mm long and 1.7 mm broad; lip 3-lobed, about 1.3 mm long and (spread out) 2 mm broad; lateral lobes ovate-falcate, obtuse, about 1 mm long; middle lobe transversely oblong, about 0.5 mm long and 1.5 mm broad, lobulate, the lateral lobules nearly as large as the lateral lobes of the lip.

LUZON, Rizal Province, Paningtingan Montalban, *Loher 13221* (type).

This is certainly a most unique species and by the character of the lip alone, which is similar to that of no other species, it may be easily distinguished.

The relationship of this species seems to be with *D. longibulbum* or at least with that group of species including *D. mindorense* through *D. simulacrum*. Because of the apparently rather complex structure of the lip it is placed near the end of that group of species.

While the material of this species available is sufficient for diagnostic purposes, more and better material is desirable in order to better establish the relationship of the species.

51. DENDROCHILUM IRIGENSE Ames

Dendrochilum irigense AMES, Orch. 5 (1915) 58.
Acoridium irigense AMES, Orch. 7 (1922) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 286.

Leaves narrowly to broadly lanceolate, acuminate, acute, 5 to 15 cm long, 8 to 20 mm broad, with 3 or 5 conspicuous nerves, the lateral ones not marginate; inflorescence surpassing the subtending leaf but surpassed by mature leaves, lax and fructuose, anthesis is from apex to base of inflorescence; bracts 4 to 5 mm long; lateral sepals broadly lanceolate, acute, 4.5 to 6 mm long, 2 to 3 mm broad; petals elliptic-ovate to obovate, erose, somewhat acute, about 6 mm long and 3.5 mm broad; lip 3-lobed, 2 mm long and 3 mm broad when spread out, the lateral lobes falcate obtuse, mid-lobe slightly exceeding the lateral lobes, trilobulate, the terminal lobule cuniform, the lateral lobules rotund.

LUZON, Camarines Sur Province, Mt. Iriga, *Bur. Sci. 22186 Ramos*, alt. 500 m, December, 1913; *Santos s.n.* (type), December, 1913.

Although *D. irigense* seems to find its closest allies in *D. hutchinsonianum* and *D. anfractum* and its variety *anfractoides* and probably *D. pumilum* as well, it is well isolated from those species, being the southernmost known of that group.

Phylogenetically *D. irigense, D. hutchinsonianum, D. anfractum* and var. *anfractoides* should probably be shown to be more closely allied to *D. pumilum* than is here done. For the reason that it is thought that *D. mindorense, D. recurvum* and *D. simulacrum* were more closely allied to *D. pumilum* they have been

given commanding position and the former species given a second position. The phylogeny of this group of species (here numbered 20 to 35a) must remain pure speculation until there has been considerably more exploration in the southern part of their range. Such exploration will undoubtedly augment the collections of the known species and bring new species of this group to light.

52. DENDROCHILUM HUTCHINSONIANUM Ames

Dendrochilum hutchinsonianum AMES, Philip. Jour. Sci. § C 2 (1907) 317; nomen, Orch. 2 (1908) 96, *text cut.*

Acoridium hutchinsonianum (Ames), MERR., Enum. Philip. Fl. Pl. 1 (1924) 286.

Acoridium hutchinsonii AMES, Orch. 7 (1922) 81, *sphalm.*

Dendrochilum hutchinsonii AMES, Orch. 7 (1922) 81, *sphalm in syn.*

Leaves lanceolate, obtuse or acute, 14 to 20 cm long (younger leaves much less), 18 to 25 mm broad, with (5 or) 7 prominent nerves; inflorescence surpassing the subtending leaf (?) but much surpassed by the mature leaves; bracts 4 to 5 mm long; lateral sepals ovate-lanceolate, about 5 mm long and 3 mm broad; petals broadly obovate, obtuse, about 5 mm long and 4 mm broad; lip 3-lobed, about 2 mm long, lateral lobes narrowly falcate, obtuse; middle lobe transversely oval but broadly apiculate, slightly surpassing the lateral lobes in length.

MINDORO, in dense mossy thicket on exposed ridge, terrestrial or epiphyte, Mt. Halcon, *Merrill 5813* (dupl. type), alt. 8,000 ft., November 20, 1906.

Known only from the type collection. Its relationship seems to be with *D. irigense.*

The figure of this species in Ames, Orch. 2 (1908) 96, shows the middle lobe relatively too quadrate.

53. DENDROCHILUM ANFRACTUM (Ames) Pfitzer

Dendrochilum anfractum (Ames) PFITZER, Engler's Pflanzr. IV. 50, II. B. 7 (1907) 118, *fig. 38P;* AMES, Orch. 2 (1908) 12–81, *t. 21, fig. I, 1.*

Acoridium anfractum AMES, Biol. Soc. Wash. Proc. 19 (1906) 148; MERR., Enum. Philip. Fl. Pl. 1 (1924) 284.

Leaves lanceolate, acute or obtuse, 3 to 12 cm long, 4 to 12 mm broad, with 3 main nerves, the lateral pair not marginate; inflorescence surpassing the leaves, lax and fructuose; bracts 4 to 5 mm long; lateral sepals lanceolate to oblong-lanceolate, acute, 5 to 6.5 mm long, 2.5 to 3 mm broad; petals oblong-obovate to obovate, margin erose or entire, 4 to 5 mm long,

3 to 4 mm broad; lip 3-lobed, about 3 mm long and 4 mm broad when spread out, lateral lobes broadly reniform, acute, much surpassing the obtuse, apiculate middle lobe.

LUZON, Lepanto Subprovince, Mt. Data, *Merrill 4482* (type), October 20, 1905: Benguet Subprovince, epiphyte in mossy forest, Mt. Simakoko, *Bur. Sci. 10, 39, 47 Ramos* and *Edaño,* alt. 6,300 to 6,500 ft., October 5, 1921; epiphyte in mossy forest, Mt. Boadan, *Bur. Sci. 40 Ramos* and *Edaño,* alt. 6,800 ft., September 26, 1921.

53a. **DENDROCHILUM ANFRACTUM var. ANFRACTOIDES (Ames) L. Wms., comb. nov.**

Dendrochilum anfractoides AMES, Orch. 3 (1908) 13, *t. 28;* Philip. Jour. Sci. § C 4 (1909) 665.

Acoridium anfractoides AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 284.

Leaves lanceolate to oblong-lanceolate, acute or obtuse, 4 to 12 cm long, 8 to 18 mm broad, with 3 (rarely 5) prominent veins, the two lateral ones not marginate; inflorescence surpassing the leaves, lax and fructuose; bracts 4.5 to 6 mm long; lateral sepals broadly lanceolate to lanceolate-oblong, acute, 4.5 to 7.5 mm long, 2.5 to 4 mm broad; petals oblong-lanceolate to suborbicular, margin erose to entire, 4 to 6 mm long, 2.5 to 4 mm broad; lip, transversely broadly ellipsoid 3-lobed, about 3 to 3.7 mm long and 5 to 6 mm broad when spread out; the sinus between the laterals and middle lobe shallow; the lateral lobes caudate, exceeding the mid-lobe, the middle lobe tridentate, the middle tooth is cuneate and a little longer than the lateral teeth.

LUZON, Benguet Subprovince, Mt. Pauai, *Haight 10,* June, 1913; *Bur. Sci. 8358 McGregor,* alt. about 2,100 meters, June, 1909; *Bur. For. 4312a Mearns,* July, 1907; Mt. Pulog, *Bur. Sci. 8834, 8858 McGregor,* July, 1909; epiphyte in mossy forest, Mt. Simakoko, *Bur. Sci. 11, 49 Ramos* and *Edaño,* alt. 6,500 ft., October 5 to 6, 1921; *Bur. Sci. 48a Ramos* and *Edaño,* October, 1921; epiphyte in mosy forest, Mt. Natao, *Bur. Sci. 48 Ramos* and *Edaño,* alt. 5,800 ft., September 30, 1921.

The species and the variety are very closely allied. The main distinction is in the lobing of the middle lobe of the lip. In all of the specimens examined this character seems to hold.

The petals and sepals in both entities are quite variable, both as to shape and to size.

54. DENDROCHILUM APICULATUM (Ames) L. Wms., comb. nov.

Acoridium apiculatum AMES, Blumea, Suppl. 1 (1937) 70.

Leaves oblong-lanceolate, obtuse, 6 to 9 cm long, 1 to 1.7 cm broad, with 5 prominent nerves, the lateral pair not on the margin; inflorescence surpassing the leaves, 6 to 8 cm long, bracts 3.5 to 5 mm long; lateral sepals lanceolate, acute, about 6 mm long and 2 mm broad, more or less coherent along the adjacent margins; petals lanceolate or oblanceolate, acute, margins fimbriate, about 5 mm long and 2 mm broad; lip 3-parted about 3 mm long, 2.7 mm broad, the lateral lobes falcate, obtuse, the middle lobe subquadrate, somewhat shorter than the lateral lobe, strongly retuse with a long linear-lanceolate apiculation which extends beyond the end of the erose truncate middle lobe; calluses two, opposite the sinuses, and a median carina.

LUZON, Rizal Province, without locality, *Loher, s.n.* (type), January, 1913.

Dendrochilum apiculatum is most closely allied to *D. anfractum* and its var. *anfractoides*. From both of these entities it may be easily distinguished by the strongly fimbriated margins of the petals, by the apiculation in the strongly retuse middle lobe of the lip and by the comparatively broader leaves.

55. DENDROCHILUM AURICULARE Ames

Dendrochilum auriculare AMES, Philip. Jour. Sci. § C 4 (1909) 595.
Acoridium auriculare AMES, Orch. 7 (1912) 81; MERR., Enum. Philip. Fl. Pl. 1 (1924) 284.

Leaves lanceolate to elliptic, acute or obtuse, 7 to 20 cm long, 10 to 25 mm broad, with 3, rarely 5 or 7 main nerves, the lateral pair often near enough to the margin to give it an emarginate appearance; inflorescence much surpassing the leaves; bracts 2.5 to 3.5 mm long; lateral sepals oblong-lanceolate 5 to 6.2 mm long, 2.2 to 3 mm broad; petals oblong-ovate to obovate, entire or slightly erose, 5 to 6 mm long, 2.5 to 4 mm broad; lip 3-lobed, about 4 mm long and 2 to 2.5 mm broad (mid-lobe), the lateral lobes auriform, divergent, bullate with a large callus between them, the middle lobe deeply emarginate, subquadrate or round in outline, about 2 mm long and 2.5 mm broad.

LUZON, Benguet Subprovince, *Bur. Sci. 5771, 5818 Ramos* (type), December, 1908; epiphyte in mossy forest, Mt. Simakoko, *Bur. Sci. 9 Ramos* and *Edaño*, alt. 6,200 ft., October 5, 1921; Rizal Province, Montalban, *Loher 12625*, October, 1921; *Loher 14737*, September, 1909.

The material referred to this species varies considerably in vegetative characters. The leaves in the type are much longer and comparatively narrower than in the other specimens; they also lack the marginate appearance which is found in the others. It is of interest to note that the aspect of two of the specimens from "Benguet" is more nearly like that of the specimens from Rizal than to the type.

The morphology of the flowers is so much alike in all of the specimens available that it is thought best to overlook the minor differences in the leaves.

The distance between the stations for the species is probably one hundred or more miles.

Dendrochilum auriculare seems not to be very closely allied to any other described species. Its affinities may be with *D. anfractum* and its allies.

56. DENDROCHILUM ELMERI Ames

Dendrochilum elmeri AMES, Elm., Leafl. Philip. Bot. 5 (1912) 1558.
Acoridium elmeri AMES, Orch. 7 (1921) 80; MERR., Enum. Philip. Fl. Pl. 1 (1924) 285.

Leaves lanceolate to oblong-lanceolate, acute, acuminate, 15 to 27 cm long, 2 to 3.5 cm broad with 5 prominent nerves, the lateral ones not marginate; inflorescence subequal to the leaves in length; bracts 4 to 5 mm long; lateral sepals linear lanceolate, obtuse, 6 mm long, 2 mm broad; petals oblong-lanceolate, obtuse, 6.5 mm long, 3 mm broad; lip broadly oval, entire or slightly crenate, not lobed.

MINDANAO, Davao Province, Todaya (Mt. Apo), *Elmer 10635* (type), May, 1909.

The affinities of this species may be with the species allied to *D. irigense*. No closely related species.

57. DENDROCHILUM HASTATUM Ames

Dendrochilum hastatum AMES, Philip. Jour. Sci. § C 2 (1907) 317; Orch. 2 (1908) 99, *text cut.*
Acoridium hastatum AMES, Orch. 7 (1922) 80; MERR., Enum. Philip. Fl. Pl. 1 (1914) 285.

Leaves oblanceolate, constricted near the acute apex, 3-nerved, 2 to 6 cm long, 1 to 1.5 cm broad, attenuated into a 1 to 2 cm long petiole; raceme few-flowered, rather lax; bracts 1.5 to 2 mm long; lateral sepals ovate-lanceolate, about 3 mm long and 1.75 mm broad; petals lanceolate, 2 to 3 mm long, about 1 mm broad; lip hastate, 2 to 2.5 mm long, about 2 mm broad from tips of the divergent, triangular, lateral lobes, middle lobe broadly lanceolate.

MINDORO, Mt. Halcon, *Merrill 5759* (type), November 15, 1906, *Merrill 4441*, June 15 to 27, 1906.

Dendrochilum hastatum is one of the most distinct species among the broad-leaved species, due primarily to the hastate lip, the peculiar aspect of the leaves, and the few-flowered raceme, and a hood-like structure extending around the apex of the column.

This species first appeared in Philip. Jour. Sci. as noted above but it was not intended to be published in that place. Nevertheless, the short description given is sufficient to distinguish it from all others and specimens are cited; the Merrill specimen first and hence it is here designated and accepted as type. Later the species was more fully described in Orch. 2 (1908) 317, and the Merrill specimen, which is a poor one, was unfortunately cited first.

58. **DENDROCHILUM MERRILLII Pfitz.**

Dendrochilum merrillii PFITZ., Engler's Pflanzr. IV. 50. II. B. 7 (1907) 110, *fig. 38A, B;* AMES, Orch. 2 (1908) 12, 102, *t. 23, fig. I, 1, text cut.*

Acoridium merrillii AMES, Biol. Soc. Wash. Proc. 19 (1906) 151; MERR., Enum. Philip. Fl. Pl. 1 (1924) 287.

Leaves oblong-lanceolate, acuminate, abruptly contracted into a petiole, 6 to 7 cm long (incl. petiole), 1.4 to 3 cm broad; with usually, 5 main nerves, sometimes 7 or 9, none on the margin; inflorescence much surpassing subtending leaf, rather compact; bract 5.5 to 7 mm long; lateral sepals linear-lanceolate to lanceolate, acute to acuminate, 6.5 to 9 mm long, 1.7 to 2 mm broad; petals lanceolate, acute to acuminate, 5.5 to 7 mm long, 1.5 to 2 mm broad; lip 3-lobed, the apical lobe much the largest, semiorbicular, blunt, about 3 to 4 mm long and 2 to 3 mm broad, the lateral lobes much smaller, half-round, directed toward the center of the flower.

LUZON, Benguet Subprovince, Mt. Pauai, *Bur. Sci. 8353 McGregor*, alt. 2,100 m June, 1909; Mancayan to Baguio, Mt. Pauai, *Bur. Sci. 21 Ramos* and *Edaño:* Lepanto Subprovince, Mt. Data, *Merrill 4858, 4585* (type), November, 1905; epiphyte, Mt. Data, *Bur. Sci. 1, 44 Ramos* and *Edaño*, alt. 7,630 ft., September 23, 1921.

This species seems to be an anomaly in this genus although technical characters would seem to maintain it here. The aspect of the plant as well as the shape of the lip remind one of § *Platyclinis* of *Dendrochilum.* It might be passed, on superficial examination as *Dendrochilum arachnites.*

Argument for the reduction of the genus *Acoridium* to *Dendrochilum* finds one of its strong supports in this species, yet little has been said about it by those who would place the genera together.

SPECIES REFERRED TO ACORIDIUM; EXCLUDED FROM THE SECTION OR LITTLE KNOWN

Acoridium arachnites ROLFE, Orch. Rev. 12 (1904) 219 = *Dendrochilum arachnites* REICHB. f.

Acoridium cobbianum ROLFE, l. c. 220 = *Dendrochilum cobbianum* REICHB. f.

Acoridium confusum AMES, Orch. 7 (1922) 80 = *Dendrochilum confusum* AMES.

Acoridium convallariaeforme ROLFE, l. c. = *Dendrochilum convallariaeforme* SCHAUER.

Acoridium copelandii AMES, Biol. Sci. Wash. Proc. 19 (1906) 152 = *Dendrochilum copelandii* AMES.

Acoridium cucullatum AMES l. c. = *Dendrochilum cucullatum* (Ames) PFITZ.

Acoridium cucumerinum ROLFE, l. c. = *Dendrochilum cucumerinum* REICHB. f.

Acoridium latifolium ROLFE, l. c. = *Dendrochilum lotifolium* LINDL.

Acoridium glumaceum ROLFE, l. c. = *Dendrochilum glumaceum* LINDL.

Acoridium graciliscapum AMES, l. c. = *Dendrochilum graciliscapum* (Ames) PFITZ.

Acoridium latifolium ROLFE, l. c. = *Dendrochilum latifolium* LINDL.

Acoridium longilabre AMES, l. c. = *Dendrochilum longilabre* (Ames) PFITZ.

Acoridium magnum ROLFE, l. c. = *Dendrochilum magnum* (Ames) PFITZ.

Acoridium maleolens (Kränzl.) AMES, Orch. 7 (1922) 81 = *Dendrochilum maleolens* KRÄNZL., Orch. 2 (1907) 63.

This species is as yet unknown to the author and no material has been seen which might be referred to it. Much of the Kränzlin herbarium is now in the Ames Herbarium but there is no material that can be construed to be this species. In comparing the species Kränzlin wrote "Die Pflanze steht *Dendrochilum oliganthum* Pfitz. (*Acoridium oliganthum* Oakes Ames) sehr nahe, hat aber fast doppelt so grosse, grüne Blüten. Das Labellum erinnert am meisten an das von *Dendrochilum tenue* Pfitz." However, from the description given of the plant it would seem to indicate that it is not particularly allied to *Dendrochilum tenue* (= *Acoridium microchilum*) as that species is here understood.

Acoridium uncatum ROLFE, l. c. = *Dendrochilum uncatum* REICHB. f.

PRELIMINARY NOTES ON THE EFFECT OF FERMENTED COCONUT SAP AND ALCOHOL IN GUINEA PIGS EXPERIMENTALLY INFECTED WITH SCHISTOSOMA JAPONICUM KATSURADA

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The writer, during her eight-months stay in Mindoro and Leyte, had an opportunity to mingle and discuss with the inhabitants of the schistosome-endemic areas about schistosomiasis, a disease caused by a blood fluke (*Schistosoma japonicum* Katsurada). From the discussion about its prevention and control she learned that there were a few who believed that fermented coconut sap [1] or "tuba" and other alcoholic beverages can prevent or cure this disease. This belief stimulated a research along this line. Hereunder, is a preliminary report of a study on the effect of "tuba" and alcohol in guinea pigs experimentally infected with *S. japonicum.*

Four sets of experiments were so far performed and in each set three guinea pigs were used. After determining the dosage of the alcoholic beverage that could induce intoxication without any fatal effect to the animals, it was finally decided to give orally to the first animal in each set 10 cc of "tuba" at intervals of two hours until it showed sign of intoxication and to the second animal an initial dose of 6 cc of 35 per cent ethyl alcohol followed by 2 cc every two hours until the animal showed the same sign of intoxication. These animals were caused to become drunk in order to simulate the effect of 'tuba" and wines upon the habitual drinkers in the schistosome-endemic regions. The third animal in each set was used as control. The administration of alcoholic beverages to the animals was started a few days before infecting them in order that they would get used to their intoxicating effect and, thenceforth, it was done daily until the conclusion of the experiment.

[1] Fermented coconut sap is commonly called "tuba" by the inhabitants of the Philippines. It is obtained by tapping the flower spathe of the coconut tree and collecting the juice that oozes out into a bamboo container. The sap is allowed to ferment and colored with powdered bark of "tangal" (*Ceriops sp.*).

All the animals in every set were each infected by spreading on the shaved belly a cercarial suspension containing almost the same number of between 100 and 150 cercaria which were obtained by crushing snails collected from the schistosome-infected regions of Mindoro and Leyte. At the close of the experiment, the animals were killed, autopsied and then the parasites in the liver, portal and mesenteric veins were collected.

The first experiment was concluded after eight weeks counting from the time the animals were infected. The parasites recovered from the "tuba," alcohol and control animals in this experiment were respectively 64, 77 and 55 per cent. In the experience of the writer, these percentages are within the range usually obtained in infecting animals without treatment. A close inspection of the above results shows that "tuba" and alcohol cannot prevent *S. japonicum* infection.

In the second experiment which was concluded 13 weeks after infection, the parasites recovered were 22 per cent from the tuba animal and 63 per cent from the control. The alcohol animal which was found dead on the eighth day after infection was discarded. In the third experiment, which was concluded on the 14th week the parasites recovered from the tuba, alcohol and control animals were respectively 16.4, 45 and 65 per cent. The fourth experiment was concluded after the same length of time as the third experiment. In this trial no parasite was recovered from the tuba and alcohol animals while 25.8 per cent was obtained from the control. Although no parasite was recovered from both tuba and alcohol animals, there was an evidence that the parasites had been in the livers of those animals as shown by the presence of very few dark pigments in the liver of the tuba animal and of some nodules containing viable eggs and more dark pigments in the alcohol animal. The cause of the early eradiction of the parasites from the tuba and alcohol animals and low percentage of recovered parasites from the control animal in this experiment is not well understood but it was presumed that it might be due to the reduced vitality of the cercaria used for infecting the animals. The cercaria used for this last experiment were obtained from snails experimentally infected in the laboratory and, therefore, might be weaker than those obtained from naturally-infected snails collected from Mindoro and Leyte. A comparative study of the potency of *S. japonicum* cercaria from laboratory-infected and from naturally-infected snails to infect laboratory animals may give light to the above observation.

In the last three experiments, the data obtained for alcohol are not sufficient to warrant any comment but the results with tuba which gave a decidedly much lower percentage of recovered parasites than the control show that this beverage from coconut might possess some active principle responsible for the partial eradication of the parasites. It also appears from the results of all four experiments that the parasitic load of infected guinea pigs is lightened by prolonging the period of administration of tuba. More trials using more animals in each set are in progress to determine, if possible, the length of time of tuba administration necessary to eradicate all the parasites in the animals infected with *S. japonicum* and to find the active principle responsible for their eradication.

SALDOIDEA OF THE PHILIPPINES (HEMIPTERA)

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Little is known about the "shore-bug" fauna of the Philippine Archipelago, wherein the superfamily Saldoidea is represented by only three species in two families—one species of Leptopodidæ and two of Saldidæ. The present paper describes a new saldid of the genus *Saldula* Van Duzee from the islands of Luzon and Mindoro. The units of measure used in the descriptions may be converted into millimeters by dividing by 80.

Distributional notes are also included on the three known species from the Philippines. More collecting will undoubtedly reveal the presence of several undescribed species, as well as the occurrence of a number of others found in Indo-Malaya, China, and the other islands of the South Pacific. The Philippine fauna is very rich in species of most hemipterous families.

Family LEPTOPODIDÆ Costa, 1838

VALLERIOLA BUENOI (Usinger)

Erianotus buenoi Usinger, Brooklyn Ent. Soc. Bull. 37 (1942) 103.
Valleriola buenoi Drake and Hottes, Jr., Kan. Ent. Soc. Jour. 24 (1951) 22.

One male, Luzon, Laguna province, October 20, 1950, G. B. Viado. Although a little smaller, it agrees very well in color and structures with a female paratype from Luzon, Rizal province, Montalban, July 24, 1936, R. L. Usinger. *V. buenoi* is not known from any other locality.

Family SALDIDÆ Amyot and Serville, 1843

SALDOIDA BAKERI Poppius

Saldoida bakeri Poppius, Wiener Ent. Zeit. 33 (1914) 52.
Saldoida bakeri Bergroth, Philip. Jour. Sci. § D 13 (1918) 124.

This striking and interesting species is known only from two macropterous females—one from Los Baños[1] (type) and the other from Mt. Maquiling. A second species of the genus was described from Taiwan (Formosa). In the New World, two more species of this curious genus were described from southeastern United States. The species are seldom captured by collectors and are rarities in collections. During the past few years, the two American species have been taken in numbers. Like other shore bugs, the species of *Saldoida* inhabit the moist shores of still and flowing waters, where the vegetation is very thin or, when denser, it is not far removed from the edge of the water.

SALDULA UICHANCOI sp. nov.

Moderately large, elongate-ovate, black with prominent whitish markings on the hemelytra; short hairs (or very long pubescence) moderately dense, semi-reclining to erect, brownish golden, more grayish brown or pronotum.

Head black with short brownish golden pubescence, longitudinally sulcate on median line in front, a small apical callosity on each side on front and a large callus bordering each eye within opposite ocelli flavous; ocelli feebly raised, approximate, separated by less than the diameter of one of them, amber-colored; apex of head largely yellowish brown, head beneath densely clothed with grayish hairs. Eyes large, brownish, slightly converging anteriorly, deeply roundly excavated within behind the middle. Antennæ dark fuscous, slender, with basal segment largely testaceous, shortly darkly pilose; formula—I, 22; II, 42; III, 40; IV, 30. Rostrum brownish, long, reaching hind coxæ.

Pronotum feebly shining, strongly narrowed anteriorly, with outer margins almost straight (very feebly rounded), three times as wide as base as median length (105:53); collar short, not raised; callus moderately elevated, convex above, with a large deep discal impression, not extending laterally on explanate margins, set off in front and behind by deep arcuate furrows, which are distinctly pitted at the bottom; explanate margins not very wide, flat; hind lobe slightly convex, about two-thirds as long as callus, deeply broadly excavated behind. Scutellum concolorous with pronotum and about as shining, slightly raised, transversely impressed at middle, pubescence as on pronotum.

[1] Los Baños, as a collecting locality, refers as a rule to the campus of the College of Agriculture and vicinity at elevation of 50 meters and above on the northeastern slope of Mt. Maquiling.

Hemelytra velvety black, not as dark as pronotum and scutellum, the short golden hairs not as dense as on pronotum; clavus with a small subapical brownish spot; inner clavus with a large median extero-marginal spot and a much smaller median subapical spot whitish; outer corium with a median spot just opposite the one in inner corium and a large median subapical spot whitish; embolium almost entirely white, semi-transparent; membrane fumose, composed of four cells, veins and margins of cells adjoining veins dark fuscous or blackish. Body beneath blackish, with grayish hairs, hind projection of last ventrite in female whitish. Legs largely testaceous, clothed with short pale hairs, the last tarsal segment darker. Body beneath black with grayish hairs.

Length, 3.25 millimeters; width, 1.48.

Type (female) Luzon, Los Baños,[1] August 8, 1950, collected by G. B. Viado; paratype (female), Mindoro, Philippines, April, 1945, taken by E. S. Ross, Calif. Acad. Sciences, San Francisco. Type in collection of C. J. Drake.

Separated from *S. ornatula* (Reuter) at once by its color pattern and antennal formula, also by these same characters from *S. javanica* Jaczewski, from Java. Antennal formula of *S. ornatula* (I, 18; II, 35; III, 26; IV, 25) is quite different.

SALDULA ORNATULA (Reuter)

Salda ornatula REUTER, Berl. Ent. Zeit. 25 (1881) 160.
Acanthia ornatula REUTER, Act. Soc. Sci. Fenn. 201 2 (1895) 46.
Salda dixoni DISTANT, Fauna Brit. Ind., Heteropt. 2 (1904) 405, *fig. 258.*
Salda dixoni DISTANT, Fauna Brit. Ind., Heteropt. 5 (1904) 221.
Salda dixoni BREDDIN, Arch. fur Nat. 78A (1912) 86. (Wrongly treated as subgenus of *Chartoscirta*).
Salda dixoni luteifusula BREDDIN, Arch. fur Nat. 78A (1912) 86.
Salda balnearum BERGROTH, Philip. Jour. Sci. § D 13 (1918) 123.

This species appears to be the commonest and most widely distributed member of the genus *Saldula* Van Duzee in the Philippines and the East Indies. It also inhabits India, China, Japan, and Central and Northern Africa. Specimens have been studied from the Philippines (Luzon, Mindoro, Cebu, Samar, Sibuyan, Negros, and Mindanao), Taiwan (Formosa), India, Malay States, Ceylon, Laurat, Solomon Islands (Randon, Fulshora), Egypt (Helwan), Belgian Congo, Nigera, Ethiopia, Gold Coast, French West Africa (Senegal, Dahoney, Lake Tchad). It is not as yet known to occur in the Australian regions.

In a paper in press elsewhere, Drake and Hoberlandt have treated *dixoni* (Distant) as a valid variety of *ornatula* (Reuter), *balnearum* (Bergroth) as a synonym of variety *dixoni*, and *luteifusla* (Breddin) as a synonym of the typical form *ornatula* (Reuter). This appears to be a logical treatment of the color form, which led largely both Distant and Bergroth to describe it as distinct species. Geographical distribution was also a factor, as the type localities of the synonyms are very widely separated. Both the typical form and variety have been taken in large numbers in Luzon, India, and at several localities in French East Africa. It is primarily a fresh water species, inhabiting the moist shores of lakes, ponds, swamps, as well as narrow banks of large and small streams. One specimen was also taken on the deck of the steamer "Albatross" at some distance off shore in Manila Bay. The long-winged individuals of Saldidæ are capable of sustained flight.

AUSTRAL-ASIATISCHE HISPINÆ, VIII

CALLISPINI *

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FÜNF ABBILDUNGEN

DIE CALLISPA-ARTEN ASIENS

Aus diesem Erdteile (von Australien und Polynesien sind bisher keine Vertreter gemeldet worden) sind 94 verschiedene Arten mit acht infraspezifischen Einheiten beschrieben worden. Von diesen kenne ich 37 Arten mit drei Chromationen, von denen in vorliegender Arbeit 14 Arten und eine Chromation behandelt werden. Im Berliner Museum befindet sich noch mehr *Callispa*-Material, das mir zur Zeit aber nicht vorliegt. Es ist schon in Beitrag (40:60–62) besprochen worden.

Bisher hat man sich begnügt, die *Callispa*-Arten Asiens hauptsächlich nach ihrer Färbung einzuteilen, so Weise in Genera Insectorum 125 (Hispinæ) (1911) 62 *et seq.*, und Maulik, Fauna Brit. Ind., Hispinæ (1919) 43–46. Aus südschinesischen Gebieten (Festland und Insel Hainan) liegen vor kleine Schlüssel Gressitt's in Lingnam Sci. Jour. **17** (1938) 323, und. *l.c.* **18** (1939) 163 and 199. Ferner mein Schlüssel der philippinischen Arten in 26c: 34 *et seq.*, in dem ich den Versuch gemacht habe, auch andere Merkmale zur Unterscheidung heranzuziehen. Einen mustergultigen Schlüssel der afrikanischen Arten gibt Spaeth in Stylops 4:255–, 193–195. Es ist aber leider nicht möglich, die asiatischen Arten in gleicher Weise zu behandeln, da die Zahl der mir bekannten Arten zu gering ist und über die Merkmale, die im Schlüssel verwendet werden könnten, in den Beschreibungen nichts gesagt wird. Es kann also nur ein Rahmen-Schlüssel gegeben werden.

Ein sehr brauchbares Merkmal ist das "Seitendach," das Spaeth zuerst bei seinen Beschreibungen von Hispinæ in Stylops benutzt hat. Das Seitendach (Dach) ist verschieden stark entwickelt. Bei *C. 12-maculata* Chapuis ist es so schmal, dass

* 1240. Beitrag Zur Kenntnis der Hispinæ (Coleoptera, Chrysomelidæ).

man sein Vorhandensein leugnen könnte, dann entwickelt es sich immermehr der Breite nach, bis es bei *C. cumingi* Baly und Verwandten die grösste Breitenausdehnung erreicht. Es kann in einer Flucht mit der Deckenwölbung verrundet oder ± breit abgesetzt sein, am breitesten verflacht ist es bei *C. curta* Weise und *C. tibangana* Uhmann.

Auf der Deckenscheibe sind 10½ Punktreihen zu zahlen. Abb. 3. Die Schildchenreihe ist bei den Asiaten immer entwickelt. Von den übrigen 10 Reihen verlaufen bei allen Arten die inneren 5 nicht gerade, sondern im Basaldrittel erst schräg nach innen und dann schwach konvergent auf die Naht zu. Reiha 8 beginnt in der Nähe der Schulterbeule und lauft etwas nach aussen, 9 und 10 haben etwa die gleiche Richtung.

Durch das Auseinanderweichen von 5 und 8 entsteht hinter dem Basaldrittel eine Fläche, welche die verkürzten Reihen 6 und 7 enthält, von beiden Reihen entspringt immer 6 näher der Schulter (höchstens individuell kann 6 bis 7 sein). Diesen Verlauf der Reihen kann man wohl mit als Charakteristikum der Gattung *Callispa* bezeichnen. Früher habe ich manchmal auch eine andere Auffassung uber den Verlauf der Reihen vertreten. So sagte ich in der erganzenden Beschreibung von *C. splendidula* Gest. in 26b:11: "An der Schulterbeule liegen 10 ganze Punktreihen," das sind Reihe 1 bis 5 und 8 bis 10 nebst 2 Reihen auf dem Seitendach; ferner "hinter ihr (der Schulterbeule) teilt sich die b." Es teilt sich aber nicht die 6., jetzt als 8. gezahlt, sondern neben dieser jetzigen 8. beginnt nach innen die 6. Reihe; "hinter der Mitte schiebt sich noch eine 12. Reihe in die beiden Aeste der 6. Reihe ein," gemeint ist die 7. Reihe, die sich zwischen die 6. und 8. Reihe, die beiden Aeste der 6., einschiebt. Weiter bemerkte ich in 36: 9 uber die Reihenbildung bei *C. picitarsis* Uhmann." An der Schulterbeule 8 Reihen, unmittelbar hinter ihr teilt sich die 6. Reihe . . . kurz vor der Mitte erscheint innen vor der ursprünglichen 6. Reihe noch eine Zusatzreihe, . . ." Nach meiner jetzigen Auffassung ist die "ursprüngliche 6. Reihe" als 8. zu zahlen, auch teilt sich die 6. nicht, obwohl es so zu sein scheint, sondern es beginnt an der vermeintlichen Teilungstelle die 6. Reihe und die Zusatzreihe zahle ich jetzt als siebente. Am Ende sind die Reihen spitzenkonvergent, es vereinigen sich meiner Meinung nach Reihe 1 mit 10, 2 mit 9, 3 mit 8, 4 mit 7, 5 mit 6. Allerdings ist artlich und individuell dieser Verlauf nicht immer einwandfrei sichtbar. Es treten Zusatzpunkte auf, z.B.liegen fast immer am Endpunkt der Vereinigungsstelle von

5 und 6 ein oder mehrere Punkte, die eine Verbindung mit Reihe 4 herstellen, sodass man über die Vereinigung der verschiedenen Reihen anderer Ansicht sein könnte. Solcher Zusatzpunkte können noch mehr auftreten, sodass schliesslich die Deckenspitze unregelmässig punktiert ist. Die Punktierung des Seitendaches ist artlich verschieden.

DIE PUNKTREIHEN DER ÜBRIGEN CALLISPINI

Allen Gattungen der Callispini liegt das oben aufgezeigte Gesetz zugrunde, so bei *Amblispa* Baly, *Pseudocallispa* Uhmann, und *Malispa* Weise, bei letzterer nach fig. 74 in Maulik, Fauna Brit. Ind., Hispinæ (1919) 21.

Es erleidet allerdings auch einige Abwandlungen. So haben die Reihen bei den *Hispodonta*-Arten die Neigung, durch Zusatzreihen eine unregelmässige Punktierung hervorzurufen. Gut zu verfolgen ist diese Erscheinung bei *Hispodonta janthina* Baly und *samarica* Uhmann. Bis zur 5. Reihe herrscht noch Regelmässigkeit. Der Bereich der 6. und 7. Reihe dagegen ist unregelmässig punktiert und beide Reihen selbst nicht mehr auszumachen. Die 8. Reihe verläuft am Rande des seitlichen Abfalles, scheint sich aber von ihrem Beginn ab schon zu verdoppeln, die 9. und 10. liegen auf dem Abfall selbst und sind durch zusatzpunkte unregelmässig. Bei *H. semperi* Chap. und *delkeskampi* n. sp. beginnt die Verwirrung der Reihen schon bei der Schildchenreihe, und die ursprüngliche Regelmässigkeit wird nur hier und da an der Basis der Decksen sichtbar. Aehnliches gilt auch für *Miltinaspis* Weise und *Spilispa* Chap.

Die Füsse der Callispini.—In vielen Fällen lasst sich eine leichte Asymmetrie der Fussglieder, vor allem des Basalgliedes der Vordertarsen, feststellen. In Abb. 2 habe ich dies bei dem linken Vordertarsus von *Spilispa imperialis* Baly gezeigt. Bei welchen Gattungen und Arten diese Asymmetrie vorkommt, und ob sie etwa sexueller Natur ist, mag späteren Arbeiten vorbehalten bleiben. Das Klauenglied gehört dem Typ I an (90: 119 ff.).

1. HISPODONTA JANTHINA (Blanchard)

Drei ♂, 3 ♀, S. Celebes: Bonthain und 2 ♀, Bantimoeroeng (C. Ribbe, 1882 und 1883) ♂: Letztes Sternit in der Mitte ausgerandet. ♀: Dieses dort ganzrandig.

2. HISPODONTA SEMPERI Chapuis

Philippinen: Luzon, 5 Imugan, 2 Mt. Banahao, 1 Balbalan.

3. HISPODONTA DELKESKAMPI n. sp.

Oblongo-ovalis, nitida, convexa, nigra, elytris testaceis. Capite lævi, medio et lateraliter leviter longitudinaliter impresso, inter antennas impresso et fortiter carinato. Antennis gracilibus,

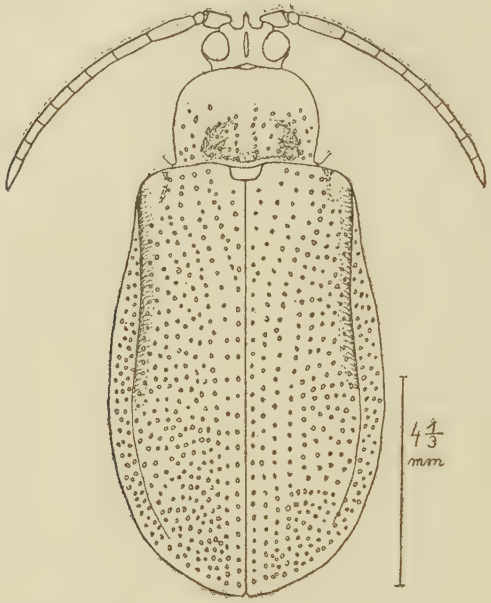

ABB. 1. *Hispodonta delkeskampi* n. sp.

tenuiter punctulatis. Prothorace transverso, postice leviter impresso, irregulariter punctato. Scuto transverso. Elytris oblongo-ovatis, margine laterali dilatato, striis quattuor interioribus subregularbus, exterioribus irregularibus. 13 × 55 mm.

Aus Neu-Guinea sind bis jetzt drei *Hispodonta*-Arten bekannt gewesen: *chapuisii* Gestro, *depressa* Gestro und *loriæ* Gestro (Ann. Mus. Stor. Natr. Genova (3) 6 (46) (1913) 13 ff. Alle drei haben aber mehrfarbige Decken. Von den mir bekannten *Hispodonta*-Arten mit einfarbigen Decken kommt die neue Art der *H. semperi* Chapuis von den Philippinen am nachsten. *H. delkeskampi* ist aber kleiner und hat hellbraune Decken, seine Fühlerglieder 3 bis 11 sind viel spärlicher punktiert und behaart, sein Kopfkiel ist lamellenartig, während er bei *H. semperi* hörnchenförming gestaltet ist.

Länglich eirund, glänzend, gewolbt, schwarz mit hellgelbbraunen Decken. Kopf glatt mit eingedrückter Längslinie und schwachem Längseindruck beiderseits, zwischen den Fühlern mit einer Längslamelle, die in einer Aushöhlung steht, im Profil ist

sie halbkreisförmig. Fühler schlank, von der Schmalseite peitschenförmig, 1. Glied nur etwas langer als das 2., an der Vorderseite nicht über die Basis des 2. Gliedes verlängert. Diese Bildung könnte bei *H. semperi* sexuell sein. Die übrigen Glieder zeigen die Gattungsmerkmale, mit feiner zerstreuter Punktierung und Behaarung, letztere nach der Spitze zu dichter. Halsschild quer, mit geschwungenem, fein gerandetem Seitenrand, nach den Vorderecken verschmälert, Hinterechen deutlich abgesetzt, vorm Schildchen niegergedrückt und uneben, Basalhälfte unregelmässigzerstreut punktiert, Mittellinie glatt. Schildchen quer. Decken mit vier nicht ganz regelmässigen inneren Punktreihen, dann unregelmässig punktiert, Skutellarreihe lang, durch Zusatzpunkte erweitert, Seitenrand breit abgesetzt.

Holotypus und 2 Paratypoide. Neu-Guinea: Sattelberg. 1. Februar, 1910 (*v. Wiedenfeld* leg.), coll. Jul. Moser.

Ein weiteres Stück vom gleichen Fundort aus coll. Hauset hat hellere Decken und punktiert-gestreifte Fühlerglieder. Ich stelle es als fraglich zu unserer Art.

4. HISPODONTA SAMARICA Uhmann (26b:5)

Ein ♂, 1 ♀, Luzon: Mt. Bulusan, Oktober, 1912 (*G. Boettcher* S), coll. Moser. Der Holotypus befindet sich zu meiner Sammlung.

♀ *Weibchen*: Allotypoid. Hinterrand des letzten Sternites nicht ausgerandet. 12 × 5.5 mm, das Männchen 9 × 4.5 mm.

Mein Holotypus von der Insel Samar ist vielleicht nicht ausgefärbt (gelbbraun), die beiden vorliegenden Stücke sind dunklerbraun, das ♀ Weibchen zeigt einen ganz leichten violetten Metallschimmer, sein Schildchen ist breiter als das des Holotypus. Fühlerglied 1 an der Spitze nicht erweitert, nur eine kleine Ecke am scharfen Vorderrand bemerkbar.

5. SPILISPA IMPERIALIS Baly

Fünf ♂, 1 ♀, Celebes: Morotai. Zwei ♀, Molukken: Mira (*Rolle* V).

Männchen: Letztes Sternit mehr oder weniger deutlich ausgeschnitten-ausgerandet. Letztes Tergit mit nach unten herumgeschlagenem, halbkreisförmigem, *gewolbtem* Rande.

♀ *Weibchen*: Letztes Sternit nur ganz undeutlich ausgerandet. Der herabgeschlagene, halbkreisförmige Teil des letzten Tergites schmal, *nicht* gewolbt.

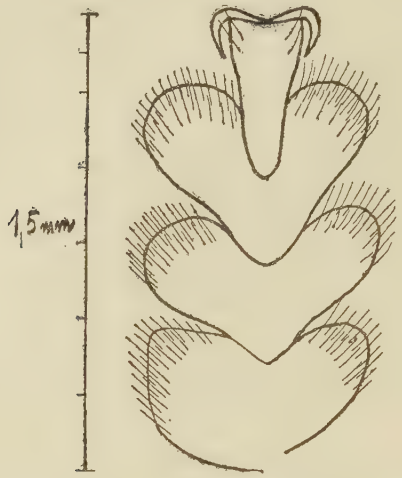

ABB. 2. Linker Vordertarsus von *Spilispa imperialis* Baly.

6. CALLISPA FEAE Baly

Seitendach nicht abgesetzt, mit zwei starken Punktreihen, die etwas schwächere nahe am Seitenrand. Es liegen drei Stück vor von Carin Cheba, 900 bis 1100 m. (*L. Fea*) Mai bis Dezember, 1888. Ein einzelnes mit dem Determinationszettel von Gestro (typus!) und zwei auf einer Nadel, von denen das untere sicher einer anderen Art angehört, die grösser (7 mm.) ist, einen stärker verengten Halsschild und längere, dünne Fühler hat, bei denen das 3. Fühlerglied doppelt so lang wie das 2. ist. Der Vermerk Gestro's "typus" heisst nicht wei angenommen wurde "Typus," sondern verglichen mit dem Typus (s.u.). Es ist demnach zu vermuten, dass das 2. Glied bei *C. feæ* so lang wie das 3. ist. Die Art wurde von Fea entdeckt und von Baly nach einem einzigen Stück Ober-Burma beschrieben, wie ausdrücklich betont wird und dann von Fea im zweiten Teile seiner Reise in Anzahl in Ost-Birma wiedergefunden. Anscheinend hat Fea aber nicht nur eine Art erbeutet, wie das die beiden Stücke auf der einen Nadel zeigen. Gestro schreibt in Ann. Mus. Stor. Natr. Genova (2) 10 (30) (1890) 232 "Variano anche le dimensioni de torace, ora più largo ora meno," glaubt aber, dass dieser Unterschied in der Variabilitätsbreite der art liege: "ma ad onta di queste differenze io credo esatto di riferire i numerosi esemplari ad una stessa forma, . . ." "Beachtet man die Bildung der Fühler mit, dann wird man wohl zu dem Schlusse kommen, dass wenigstens noch eine andere Art mitgefunden wurde, die auch der *C. bowringii*

Baly sehr ähnlich, aber doch von ihr durch die Fühler (3. Glied) verschieden ist.

7. CALLISPA FLAVESCENS Weise

Zwei Stück, Lectotypus und Paratypoid, Luzon: Rizal, Montalban Gorge, 9270 (*Schultze* S) und ein 1 Stück, 2806, Mus. Hagen. 52 Stück, Luzon: Bangui (*G. Boettcher* S). Seitendach siehe Schlüssel.

8. CALLISPA SCUTELLARIS Weise

Lectotypus: Tenasserim. Von den Fühlern links nur noch zwei Glieder und rechts ein Glied erhalten, Seitendach nicht abgesetzt, mit einer feinen Punktreihe am Rande bis zum Nahtwinkel und innen mit einer gröberen, unregelmässigen, gegen die Naht zu erloschenen Reihe.

9. CALLISPA BOWRINGII Baly

Zwei, China bor. (coll. Hauser). 16, Shanghai (*Simon*) 105882, coll. Weise. 5, Fookien: Yung-lingshan, coll. Hauser. 1, China: Canton: Saho, 7. November, 1909 (*Mell* S). 1, Canton: Lien-Cao Fluss, 22. Juli, 1912 (*Mell* S). 1, China: Wanglung-kum. Berggebiet d. Lofau-zan, am Ostfluss in Kuangtung, April bis Mai, 1912 (*Mell* S). 1, China: Ting-wu-san, Berggebiet am Westfluss, 3. Juni, 1911 (*Mell* S). 7, Hongkong.

9a. *forma.* Fünf, Tonkin: Montes Mauson, April und Mai, 2000 bis 3000 Füsse (*H. Fruhstorfer*); 1, Zentral-Tonkin: Chiem-Hoa, August bis November (*id.*). Der Halsschild viel feiner gerandet als bei dem übrigen Material aus China. Bei letzterem zieht sich am Seitenrande eine schmale Fläche entlang, diese ist aber bei den sechs Stück aus Tonkin geschwunden, ferner sind die beiden Basalglieder der Fühler nicht verdickt, sondern schlank.

10. CALLISPA WHITEI Baly

Beschrieben aus Borneo. 1, West-Sumatra: Indrapoera (det. Gestro). Ob die Stücke aus Sumatera die echte *C. whitei* sind? Vergleiche die Richtigstellung Gestro's in Ann. Soc. Ent. Belg. 43 (1894) 316, den Halsschild betreffend.

11. CALLISPA FALLAX Uhmann

Philippinen, 48 Stück, Luzon: Bangui; 1, Luzon: Imugan; 1, Luzon: Balbalan (*G. Boettcher* S), coll. Moser. Hinterleib meist rotbraun. Die dunnen Fühler sind kein Sexualmerkmal! nach Untersuchungen an meinem Material, Unterschied von *C. cumingii* Baly.

12. CALLISPA CURTA Weise

Zwei Stücke: Lectotypus und Paratypus, Perak. Seitendach breit verflacht, abgesetzt, mit einer oder zwo? recht unregel-

mässigen feinen Punktreihen, die vom Rand etwas entfernt liegen.

13. CALLISPA HORNI Uhmann (3:58).

Drei, Br. Ost-Indien: Darjeeling, Juni (*H. Fruhstorfer*). Seitendach nicht abgesetzt, mit zwei Punktreihen, von denen die innere (11.) hinter der Mitte der Decken sich der Randreihe (12.) nähert und entweder mit ihr verschmilzt oder sie ersetzt. In 3: 59 andere auf Zeile 23 "6. und 8." in "6. und 7." um.

14. CALLISPA BRETTINGHAMI Baly

Ein, Darjeeling (*Atkinson*); 5, Birma: Ehamo, Fea, August, 1885 (teste Baly). Seitendach völlig mit der Deckenwölbung verrundet. Reihe 12. sehr fein am Seitenrand, vor der Deckenmitte verschwunden, 11. stark, nach Erloschen der 12. am Seitenrand diese vertretend, am Hinterwinkel undeutlich werdend.

15. CALLISPA SPLENDIDULA Gestro

Sechs, Borneo: Kina Balu (nech Weise *C. whitei* Baly.)

16. CALLISPA DIMIDIATIPENNIS var. B, Baly

Seihe Baly, Ann. Mus. Soc. Natr. Genova (2) 6 (1888) 654; Gestro, *loc. cit.* (2) **10** (30) (1890) 231. "Ost-Birma: Charin Chebà, 900 bis 1000 m. (*L. Fea,* Mai bis Dezember, 1888), Gestro det., 81606. In meiher Sammlung ein Stuck gleicher Herkunft aus coll. Kraatz, das ich als *C. brettinghami* Baly erhielt und eine aus Nord-Bengalen: Kurseong. Diese var. *B* Baly ist sicher eine neue Art, leider nimmt Maulik in seiner Fauna Brit. India, Hispinæ, zu der Beschreibung Baly's keine Stellung. Am besten passen die Stücke noch zu *C. montivaga* Maulik (*l.c*: 63–). Fühler ohne Basalglied aber ganz schwarz. Seitendach wie bei *C. dimidiatipennis.*

17. CALLISPA DIMIDIATIPENNIS Baly

Vier, Benglen (Mus. Hagen) 28055. Seitendach völlig mit der Deckenwölbung verrundet, nur mit *einer* feinen Reihe am Seitenrand.

18. CALLISPA 8—PUNCTATA Baly CHROMABION 6—MACULATA Weise

Holotypus: Kanara (*Andrewes*). Seitendach nicht entwickelt, 10. Punktreihe stark, bis zum Rande nur ein schmaler Zwischenraum, Decken fein gerandet, alle Reihen stark, auf dem Spitzendrittel feiner punktiert.

19. CALLISPA 12-MACULATA Chapuis

Fünf, Java: 3, Buitenzorg (*Kraepelin*); 2, Tjilatjap (*Drescher* S). Seitendach nicht entwickelt, 10. Reihe vom Rande etwas entfernt.

20. CALLISPA CONTAMINATA Weise

Lectotypus: Sud-Indien: Shembaganur (*Heyne,* Berlin). Seitendach verflacht, schmal, ohne punktreihe, von der 10. Reihe angegriffen.

21. CALLISPA VITATA Baly

Je 1, Kanara (*Andrewes*) und Nilghiri Hills (*id.*). Das von Weise, Dtsch. ent. Z. (1905) 114 erwahnte Stück mit einfarbig gelben Decken ist nicht mit dabei.

22. CALLISPA LOXIA Weise

Nach dem Autor gibt es nur einen Typus, in coll. Andrewes, Dtsch. ent. Z. (1897) 115, nach Maulik, Fauna Brit. India, Hispinæ (1919) 69, soll sich dieser in der Sammlung Weise befinden. Die Art ist in der Sammlung nicht vertreten.

23. CALLISPA NIGRICORNIS Chapuis, nec Baly

Chapuis meldet *C. nigricornis* Baly von Luzon, (Ann. Soc. Ent. Belg. 19 (1876) C.R.: 17). Weise bezieht in Ann. Soc. Ent. Belg. 55 (1911) 75, und in seinen katalogen die Art auf seine neue Art *C. flavescens.* Gestro stellt die Art in Ann. Mus. Stor. Natr. Genova, (3) 7 (47) (1917) 398, zu *C. nigricornis* Baly nach einem Stück von Mindanao: Zamboanga, das nur kleine Unterschiede von der Beschreibung Balys aufweist. In Uhmann 26b: 13, habe ich ausgeführt, dass Gestro's Annahme nicht richtig ist. Das von ihm, *l.c.*, erwähnte Stück habe ich untersucht. Es ist von *C. nigricornis* Baly verschieden und gehört zur neuen Art *C. philippinica* Uhmann (26b : 14). Ob diese die *C. nigricornis* Chapuis ist? In Uhmann 26b : 13 habe ich die Vermutung ausgesprochen, dass die Art von Chapuis zu meiner *C. raffaeli* = *puellaris* Pic gehören könne. (In Uhmann 26b : 13, Zeile 3, streiche 10!). Nachforschungen zufolge, die auf meine Bitte im Brüssler Museum liebenswürdigerweise angestellt worden sind, befindet sich kein Stück der behandelten Art in den dortigen Sammlungen, wohl aber zwei Stück der *C. nigricornis* Baly von Ceylon (Chapuis det., 1877).

C. nigricornis Baly.—Seitendach der eben er wähnten Stücke sparsam mit Punkten besetzt, die sich nur vorn und hinten zu einer kurzen Reihe ordnen, die nicht immer deutlich ist. Reihe 6 und 7 wie bei den ubrigen *Callispa*-Arten.

Nach den bisherigen faunistischen Erfahrungen bei den Hispinæ halte ich es für wenig wahrscheinlich, dass eine Ceylon-Art auch auf den Philippinen vorkommen könnte. Mit nur ganz wenigen, Arten greifen die philippinischen Hispinæ-Arten auch auf andere Faunengebiete über. Die Insel Palawan nimmt

eine Sonderstellung ein. So eine Art ist *C. 12-maculata* Chapuis, die auch in Java und Sumatra vorkommt, auf den Philippinen aber selten zu sein scheint.

24. AMBLISPA DOHRNI Baly

Sechs, Ceylon (*Nietner*) 28059; 2, Nuwara-Eliya (*E. Simon* 1892). Halsschild neben der Mittellinie mit je einem mehr oder weniger deutlichen Eindruck, diese beiden punktierten Eindrücke in der Mitte jeder Scheibenhälfte Decken mit zehn punktreihen, die hier und da Zusatzpunkte haben, 6. und 7. Reihe in der Basalhälfte abgekürzt. Seitendach nicht entwickelt, aber eine mehr oder weniger feine 11. Reihe hart am Rande unter der Schulter vorhanden. Zwischenräume unpunktiert.

25. AMBLISPA LAEVIGATA (Guérin)

Ein, Chota-Nagpore, Nowatoli (*R. P. Cardon.*, August bis November, 1896), Gestro det. 105898; 1, Belgaum (105900); 1, Ceylon: Kandy (coll. *Moser*). Reihe 11 direkt am Rande, vollstandig. Zwischenräume fein punktiert (siehe Maulik, Fauna Brit. India, Hispinæ, (1919) 73. Bei einem Stuck aus Kanara, 105899, sind die Raume unpunktiert und die Reihen einander paarweise genahert, ob. *A. laevigata* Guer.?

Schlüssel der mir bakannten Callispa-Arten

1 (28). Seitendach breit; bis etwa zur Deckenmitte ist das Seitendach von der 10. Punktreihe ab gerechnet breiter als die Fläche zwischen der Reihe 8 bis 10.

2 (15). Seitendach mit der Deckenwölbung in einer Flucht verrundet oder nur ganz schwach abgesetzt. Die Absetzung des Daches erfolgt an der 10. Reihe (Profil vom Kopf her).

3 (10). Seitendach mit zwei Punktreihen, die aber durch Zusatzpunkte unregelmässig erscheinen können: Eine feine Reihe am Seitenrande und eine grobe nicht weit von der 10., dazwischen Zusatzpunkte.

4 (7). Kopf zwischen die Augen breit und stumpf vorgezogen.

5 (6). Oberseite blaumetallisch, Fühler schwarz. Lange, 5 mm.
Birma, Tonkin ..... *feæ* Baly.

6 (5). Oberseite gelbbraun ohne schwarze Spitzenbinde auf den Decken, Fühler schwarz. Länge, 5.5 bis 6 mm.
Philippinen ..... *flavescens* Weise.
mit schwarzer Spitzenbinde.
Philippinen ..... chromation *arcuata* Uhmann.

7 (4). Kopf spitz vorgezogen. Oberseite blaumetallisch.

8 (9). Schildehen stark quer. Länge, 5 mm.
Tenasserim ..... *scutellaris* Weise.

9 (8). Schildchen nur wenig breiter als lang. Länge, 5.5 bis 6.5 mm.
Hongkong, Canton, Tonkin, Fukien, Shanghai, Hainan.
bouringii Baly.

10 (3). Seitendach unregelmässig punktiert, die Punkte lassen sich nicht zu Reihen Anordnen.

11 (14). Kopf zwischen die Augen spitz vorgezogen. Blaumetallisch.
12 (13). Fühlerglied 3 doppelt so lang wie 2. Länge, 4.5 bis 5 mm.
Borneo, Sumatra ..... *whitei* Baly.
13 (12). Fühlerglied 3 wenig länger als 2. Länge, 4 mm.
Java ..... *roepkei* Uhmann (14: 144, f. 1).
14 (11). Kopf zwischen die Augen breit und stumpf vorgezogen.
Gelbbraun. (Fühler schwarz. Dach fast in einer Flucht mit den Decken verrundet. Länge, 5.5 mm. (Abb 3).
Sumatra ..... *flaveola* Uhmann (34: 193).

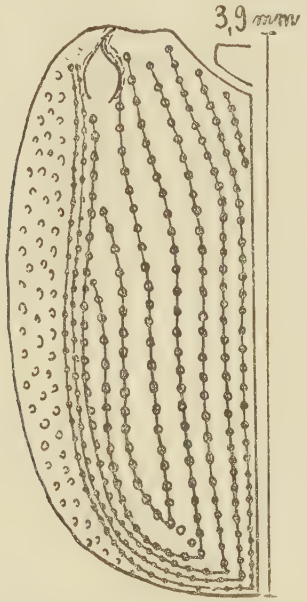

Abb. 3. *Callispa flaveola* Uhmann. Holotypus, linke Decke, Halbschematisch.

15 (2). Seitendach von der 10. Reihe ab mehr oder weniger stark abgesetzt oder verflacht.
16 (23). Seitendach nicht verflacht.
17 (22). Halsschild-Seitenrand glatt, einfach. Blaumetallisch.
18 (19). Körper länglich, Seiten der Decken fast parallel. Länge, 5.5 mm.
Luzon ..... *picitarsis* Uhmann (26b: 9).
19 (18). Körper breiter, oval.
20 (21). Fühler stark, erst nach dem 4. Glied pfriemlich. Länge, 5 bis 6.8 mm.
Luzon, Palawan ..... *cumingii* Baly.
Hierher *C. apicalis* Pic. China, Fukien.
21 (20). Fühler schlank, schon vom 3. Glied ab pfriemlich. Länge, 5 mm.
Luzon, Mindanao ..... *fallax* Uhmann (26b : 8–).
22 (17). Halsschild-Seitenrand unduliert (etwa fünf Einkerbungen). Blaumetallisch. Länge, 4.25 mm.
Philippinen ..... *undulata* Uhmann (40: 61, f. 1).
23 (16). Seitendach verflacht.

24 (27). Dach mit zwei unregelmässigen Reihen. Korper breit-oval.
25 (26). Halsschild-Seiten hinten parallel. Rotbraun, Spitzenhälfte der Decken mit metallischem Fleck, Fühler ohne die beiden Basalglieder schwarz. Länge, 3.5 mm.
Perak ..... *curta* Weise.
26 (25). Halsschild-Seiten von der Basis nach vorn schnell verengt. Rotbraun, fast die ganze Spitzenhälfte der Decken schwarz, Fühler schwarz. Länge, 4.5 mm.
Java ..... *drescheri* Uhmann (53: 143–).
27 (24). Dach mit einer Punktreihe in der Mitte. Gelbbraum, Fühler schwarz. Länge, 4.75 mm.
Borneo ..... *tibangana* Uhmann (74: 2, f. 1, 2).
28 (1). Seitendach schmal.
29 (64). Dach mit Punktreihen.
30 (37). Dach mit zwei ziemlich regelmässigen Punktreihen.
31 (32). Dach abgesetzt. Reihen schwach unregelmässig.
32 (31). Dach in einer Flucht mit den Decken gewölbt.
33 (34). Die feinere Randreihe hinter der Mitte rückgebildet, auch im Basalteil oft durch fehlende Punkte unterbrochen. Die viel stärkere 2. Reihe tritt in der Spitzenhälfte an den Rand heran. Kopf zwischen die Augen breit und stumpf vorgezogen. Kopf und Halsschild gelbbraun, Decken metallisch, Fühler schwarz. Länge, 8 bis 9.5 mm.
Birma, Sikkim ..... *brettinghami* Baly.
34 (33). Beide Reihen fast gleich stark.
35 (36). Beide Reihen oft unregelmässig. Oberseite blaumetallisch. Länge, 4.3 bis 5 mm.
Borneo, Palawan, Java ..... *splendidula* Gest.
36 (35). Beide Reihen regelmässig. Kopf und Halsschild rötlichbraun. Decken blaumetallisch. Länge, 4.5 mm.
Sarawak, Palawan ..... *bicolor* Gest.
Hierher noch *induta* Uhmann (26b: 10), Sumatra, Länge, 4.5 mm. (16: 6), und *palawanica* Uhmann, Palawan, Länge, 5.5 mm.
37 (30). Seitendach schmal, sodass es zuweilen als nicht vorhanden bezeichnet werden kann, am Aussenrand mit einer Reihe, unter der Schulter manchmal mit einigen Zusatzpunkten: hinter der Schulter bis zum Hinterwinkel wenig oder nicht breiter als der Raum zwischen der 9. und 10. Reihe, Kopf und Halsschild rotlich- bis gelbbraun.
38 (43). Decken ganz metallisch.
39 (40). Ueber 5 mm.
Nord-China, Fukien. Länge, 7 mm. ..... *fortunii* Baly.
Birma, Tenasserim. Länge, 7.5 bis 9 mm. *dimidiatipennis* var. *B* Baly.
40 (39). Unter 5 mm.
41 (42). Decken ganz metallisch. Länge, 4.25 mm.
Luzon ..... *spaethi* Uhmann (26b: 11).
42 (41). Decken blaumetallisch mit rötlichem Rand. Länge, 3.5 mm.
Sumatra, Java ..... *marginipennis* Gest.

Mein beiden Stücke von Java und der Insel Batoe, die ich für diese Art halte, haben schwarzglänzende Decken mit sehr schmalem gelbbraunen Rand, vergl. 31: 2.

43 (38). Decken anders gefärbt.

44 (57). Decken vorn von der Grundfarbe, hinten metallisch.

45 (46). Seitendach deutlich abgesetzt, Hinterhälfte der Decken metallisch, diese Färbung konvex vorgezogen Körper gross. Länge, 7.5 bis 9 mm.

Nordindien, Assam, Birma, Tonkin..... *dimidiatipennis* Baly.

46 (45). Dach hochstens schwach abgesetzt, meist mit der Deckenwölbung verrundet.

47 (48). Körper gestreckt, schlank, Decken– und Halsschild–Seiten parallel, Hell gelbbraun, Fühler schwartz, Spitzenhälfte der Decken blaumetallisch. Dach hinten etwas abgesetzt. Länge, 5.5 bis 6 mm. (Abb. 4.) No. Birma..... *procedens* Uhmann (74: 1–).

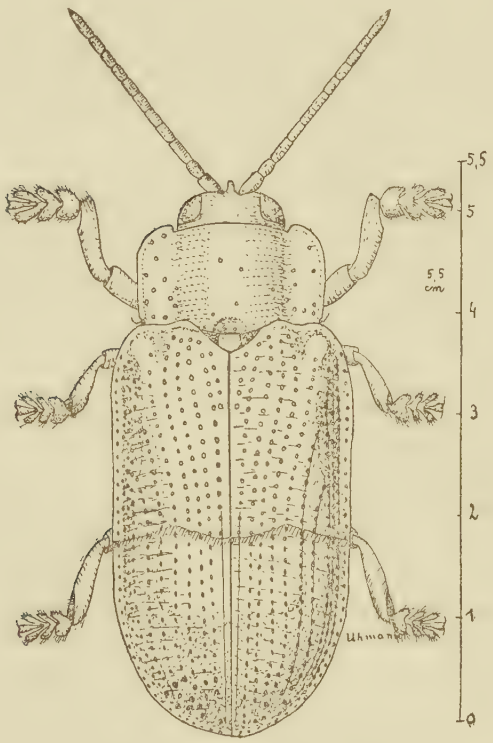

Abb. 4. *Callispa Procedens* Uhmann
Paratypus.

48 (47). Decken–Seiten nicht parallel, daher der Körper mehr oder weniger kleiner als 6 mm.

49 (50). Halsschild glatt, nur in den Hinterwinkeln mit einigen Punkten. Die knappe Spitzenhälfte metallisch. Länge, 4.75 m.

Insel Natuna, Insel Batoe..... *cribrata* Gest.

50 (49). Halsschild auch auf der Scheibe punktiert.

51 (52). Decken breit-oval. Ein gros ser gemeinsamer Fleck auf der hinteren Deckenhälfte oder letztere ganz metallisch. Länge, 5 mm.
Summatra, Java, Batoe, Malakka ..... *elegans* Baly.

52 (51). Decken schwacher oval.

53 (54). Reihen der Decken stark und nicht sehr dicht punktiert. Spitzenhälfte der Decken metallisch. Länge, 3.25 mm.
Mentawei, Java ..... *pusilla* Gest.

54 (53). Reihen aus dichten, schwacheren Punkten gebildet.

55 (56). Fühlerglied 3 nur wenig länger als 2. Die knappe Hinterhälfte der Decken metallisch. Länge, 3.75 mm.
Luzon ..... *luzonica* Pic (Échange 46, nr. 440 (1930) 8, *fatua* Uhmann, 26b: 14).

56 (55). Fühlerglied 3 doppelt so lang wie 2, die Glieder vom 3. ab schlanker als bei voriger. Decken nur an der Spitze verwaschen metallisch. Länge, 4 mm.
Mindoro ..... *boettcheri* Uhmann (26b: 15).

57 (44). Die dunkle Färbung anders verteilt, oder Decken einfarbig gelbbraun, Fühler schwarz. Kopf, Halsschild, Beine gelbbraun.

58 (63). Decken nicht einfarbig gelbbraun.

59 (60). Jede Decke mit einer schwarzen Längsbinde in der Mitte der Scheibe. Länge, 3.5 bis 4 mm.
Luzon ..... *nigrovittata* Gest. [Ann. Mus. Stor. Natr. Genova (3) 7 (47) (1917) 397–].

60 (59). Decken gefleckt.

61 (62). Decken gelbbraun, jede mit einem metallischen, runden Fleck hinter der Mitte. Länge, 3.3 mm.
Java ..... *bioculata* Uhmann (78:38 ff).

62. (61). Decken schwarz mit einem gemeinsamen, runden, gelbbraunen Fleck hinter der Mitte, der fast bis zur Spitze sich erstreckt. Länge, 3.75 mm.
Luzon ..... *guttata* Uhmann (40: 62).

63 (58). Decken einfarbig gelbbraun. Länge, 4 mm.
Philippinen..... *puellaris* Pic [Échange 46, nr. 440 (1930) 8]. (*raffaeli* Uhmann 26: 12).
Hierher *C. philippinica* Uhmann. Länge, 4.5 mm. Mindanao. (26b : 14).

64 (29). Seitendach schmal, wenig entwickelt, ohne Punktreihen. (Man könnte die Decken auch als sclche "ohne Seitendach" bezeichnen. Fühler schwarz.

65 (68). Decken und Seitendach in einer Flucht gewölbt. Kopf, Halsschild, Beine rötlich– bis gelbbraun.

66 (67). Die 10. Reihe grob, bis zum Seitenrand kein Platz für noch eine solche. Jede Decke mit vier schwarzen Flecken. Länge, 5 mm. [Maulik, Fauna Brit. India, Hispanæ (1919) 51–, f. 16.]
Ceylon ..... *octopunctata* Baly.
Letztes Fleckenpaar zu einer gemeinsamen Querbinde verbunden. Länge, 5 mm.
Bombay: Kanara ..... Chrom. *sexmaculata* Weise.

67 (66). Die 10. Reihe nicht gröber als die anderen Reihen, vorn hätte noch eine zweite Reihe bis zum Seitenrande Platz.
Gelbbraun, Schildchen schwarz, ebenso je ein gemeinsamer Fleck auf der Naht hinter dem Schildchen und auf dem Abfall, ausserdem jede mit fünf Flecken, von denen vier in einer Reihe stehen. Länge, 4 bis 6 mm.
Philippinen: Bohol, Samar; Sumatra; Bombay.
duodecimmaculata Chapuis.

68 (65). Seitendach schmal, aber dentlich abgesetzt.

69 (70). Kopf mit einer und Halsschild mit zwei bräunlichen Längslinien. Decken mit je vier verloschenen, bräunlichen Flecken. Länge, 3.6 mm.
Ost-Indien ..... *contaminata* Weise [Arch. Natg. 78 A. (1912) 109– (13)].

70 (69). Kopf und Halsschild einfarbig.

71 (72). Jede Decke mit einer schwarzen Längsbinde. Länge, 5.5 mm.
Ost-Indien ..... *vittata* Baly.

72 (71). Decken strohgelb, Basis, Naht und Seitenrand schwarz, Farbverteilung veränderlich. Länge, 4.5 bis 5 mm.
Borneo, Sumatra, Java..... *amabilis* Gestro.

VERWANDTSCHAFTLICHE BEZIEHUNGEN ZWISCHEN DEN CALLISPA–ARTEN ASIANS UND AFRIKAS

Uebereinstimmung herrscht in der Ausbildung der Punktreihen, vor allem der 6. und 7.* Nicht bekannt sind asiatische. Arten mit sehr schlanken Fühlern, also vertreter des Subgenus *Callispella* Spaeth (Stylops 4 (1935) 225. Wenn man die Arten mit einfach gewölbten Decken und 11½ Punktreihen als die ursprünglichen ansieht, dann findet bei den Asiaten eine Weiterentwicklung bei den zahlreichen Arten mit deutlichem Seitendach statt, am weitesten weiterentwickelt bei *cumingii, fallax, flavescens, flaveola.* Arten mit 10½ Punktreihen, also solche ohne eigentliches Seitendach sind mir von den Asiaten 5 Arten bekannt, siehe Schlüssel 64 bis 72, von den Afrikanern keine. Letztere zeigen wenig Neigung, das Seitendach zu verbreitern. Alle mir aus Afrika bekannten Arten haben 11½ Reihen, von denen die 11. nahe der 10. verlauft, meist sehr fein ist (Ausnahme *impressa* Uhmann 95: 5–,f.1) (Abb. 5) und direckt dem Seitenrand anliegt. Statt des Daches verdickt sich dieser zu einer Art dicken Rippe, z.B. bei *testacea* Kr., *ugandina*

* In meiner Beschreibung der *Callispa nyakensis* 43 : 390– schrieb ich p. 391 "rows 5 and 6 begin only at the middle of the elytra," es muss heissen: "rows 6 and 7 . . ."

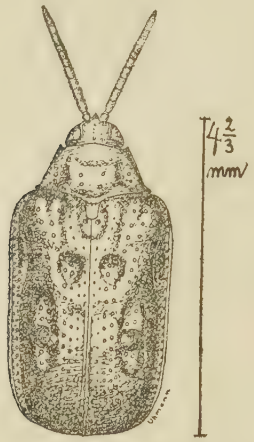

ABB. 5. *Callispa impressa* Uhmann.

Spaeth, *impressa* Uhmann, *limbata* Gest. Bei letzterer ist der Seitenrand verflacht abgesetzt und bildet ein deutliches Seitendach (*limbata* hat eine nur ganz kurze 7. Reihe!). Sie ist die einzige mir bekannte afrikanische Art mit verflachtem Seitendach. Dafür beginnt die Scheibe der Decken uneben zu werden und neigt zu Beulen und Eindrucken und zwar zwei Stück letzterer im Bereich der verkürzten 6. und 7. Reihe und manchmal einem auch weiter vorn zwischen der 3. und 4. Reihe (Abb. 5). Bei *limbata* sind die Beulen noch flach wenig entwickelt, ebenso bei *nyakensis* Uhmann 43 : 390 ff.). Individuelle Abweichungen kommen vor. Bei *kuntzeni* Uhmann (35 : 839) sind alle Eindrücke deutlich, ebenso bei *impressa* (Abb. 5) ; *intermedia* Uhmann (35: 838 ff.) hat keine ausgesprochenen Eindrücke, dafür erweitern sich die Zwischenraume zwischen den Reihen und Punkten stellenweise zu Querflachen, und die ganze Deckenskulptur beginnt unregelmässig zu werden.

Einen grundsätzlichen Unterschied zwischen afrikanischen und asiatischen *Callispa*-Arten, wie er bei den *Oncocephala*-Arten vorhanden ist, habe ich nicht gefunden, wohl aber eine Divergenz in der Weiterentwichlung der Fühler bei *Callispella* und der Decken durch Ausbildung eines Seitendaches bei den Asiaten einerseits und durch Verstärkung der Deckenskulptur durch Eindrücke und Beulen bei den Afrikanern andererseits.

Eine Einreihung der asiatischen Arten unter die afrikanischen ist nicht angängig. In jedem der beiden Faunengebiete hat sich die Gattung getrennt weiterentwickelt.

Die Holo—(Lecto-) typen einiger von mir beschriebenen *Callispa*-Arten. Vergleiche die Ausfuhrungen in meinem Beitrag 109, Additamenta fauna Coleoptororum 4 (1946) 19, (48).

(1) *C. bioculata* Uhmann 78 : 38 ff. Java: Preangar. Coll. Uhmann.

(2) *C. flavescens* chr. *arcuata* Uhmann 26 : 10. Philippinen : Catanduanes Inseln. Coll. Uhmann.

(3) *C. roepkei* Uhmann 14:144. Java: Buitenzorg. Lectotypus. Coll. Uhmann.

UEBER DIE TYPEN WEISE'S

Weise hat in seinen Arbeiten über die Hispinæ den Begriff des Holo-Spezietypus nicht verwendet; nur in drei Fällen hat er den des Holo-Genotypus angewandt, bezw. erwähnt.

(1) Arch. Naturg. **71** (1905) 63–, für *Chalepus* Thunberg, *Baliosus* Weise, *Agathispa* Weise, und *Anoplitis* Chap. Letzerer wurde schon von Chapuis bestimmt.

(2) Dtsch. ent. Z. (1905) 377 ff, für *Monochirus* Chapuis und *Pseudispella* Kr.

(3) *l.c.* (1916) 38, für *Lasiochila* Weise und für *Chalepus* Thunberg in Wiederholung.

In dem von mir studierten Teile seiner Sammlung im Berliner Meseum hat Weise kein Stück ausdrücklich als Typus bestimmt. Wohl aber hat er je ein Stück einer neu von ihm erkannten oder beschriebenen Art mit Namen und "m" versehen. Diese Stücke würde er nach unserer jetzigen Vorschrift wohl als Holotypen bezeichnet haben. In meinen früheren Arbeiten habe ich diese m-Stücke auch als Holotypen aufgeführt. Nach der neueren, strengen Auffassung kann man sie nur als Lectotypen betrachten. Soweit sie Weise in seinen Beschreibungen nicht ausdrücklich als Holotypus zu gelten. Ob Weise von den Stücken die er an Museen un andere Sammlungen als Vertreter seiner neuen Arten abgeben musste auch welche mit der Mihi-Bezeichnung versehen hat, entzieht sich meiner Kenntnis. Namen der Arten und infraspezifischen Einheiten der austral-asiatichen Callispini die in beiden Weiseschen Katalogen von 1911 nicht mit aufgeführt sind mit der Angabe der Erstbeschreibung und des Originalfundortes.

CALLISPA Baly

1. *almora* Maulik, Proc. Zool. Soc. London (1923) 599–, Abb. 1. Himalaya.
2. *angusticollis* Maulik, Fauna Brit. India, Hispinæ (1919) 54–. Madras.
3. *apicalis* Pic, Bull. Soc. ent. France 49 (1924) 99–. China: Fookien.
4. *assama* Maulik, Fauna Brit. India, Hispinæ (1919) 68–. Assam.

5. *bioculata* Uhmann, Treubia 17 (1939) 38–. Java.
6. *boettcheri* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 15–. Mindoro.
7. *bowringii* var. *attripes* Pic, Mél. exot. ent. 42 (1924) 27. China.
8. *brevipes* Maulik, Fauna Brit. India, Hispanæ (1919) 66–. Ceylon.
9. *cæruleodorsata* Maulik, *l.c.* (1919) 65. Madras.
10. *contaminata* Weise, Arch. Natg. (A) 78 (1912) 109, (13). Ostindien.
11. *curtipennis* Pic, Bull. Soc. ent. France, (1925) 324. Saigon.
12. *cyanipennis* Pic, Mél. exot. ent. 42 (1924) 27. China.
13. *drescheri* Uhmann, Treubia, 15 (1935) 143–. Java.
14. *dimidiatipennis* var. *latior* Pic, Mél. exot. ent. 42 (1924) 27. Tonkin.
    ssp. *recticollis* Gressitt, Lingnan Sci. Jour. 17 (1938) 321. Hainan.
15. *donckieri Pic*, Bull. Soc. ent. France 49 (1924) 99. China: Fookien.
16. *elongata* Pic, Échange 39, nr. 416 (1924) 24. Tonkin.
17. *expansicollis* Maulik, Fauna Brit. India, Hispinæ (1919) 55. Assam.
18. *fallax* Uhmann, H. Beitr. syst. Ins. k. 5 (1931) 8–. Luzon.
19. *fatua* Uhmann, *l.c.* 5 (1931) 14–. Luzon.
    luzonica Pic.
20. *flaveola* Uhmann, Zool. Meded. Leyden 14 (1931–32) (31). Sumatra.
21. *flavescens* chrom. *arcuata* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 10. Philippinen: Catanduanes Ins.
22. *flavonotata* Pic, Bull. Soc. ent. France 49 (1924) 100. Sumatra.
23. *fortunei* ssp. *emarginata* Gressitt. Lingnan Sci. Jour. 17 (1938) 322–. Hainan.
24. *fulvonigra* Maulik, Fauna Brit. India, Hispinæ (1919) 49. Ceylon.
25. *guttata* Uhmann, Fol. zool. hydrob. 5 (1933) 62. Luzon.
26. *horni* Uhmann, Ent. Bl. 23 (1927) 58–, Abb. 1. Sikkim.
27. *hypœnops* Maulik, Fauna Brit. India, Hispinæ (1919) 60–. Assam, Indochina.
28. *induta* Uhmann, Misc. zool. Sumatra 43 (1930) 6. Sumatra.
29. *jeanvoinei* Pic, Mél. exot. ent. 49 (1927) 25. Tonkin.
30. *karena* Maulik, Fauna Brit. India, Hispinæ (1919) 62. Birma, Indochina.
31. *krishnashunda* Maulik, *l.c.* (1919) 47. Ceylon.
32. *latipennis* Pic, Bull. Soc. ent. France 49 (1924) 99. Sikkim.
33. *luzonica* Pic, Échange 46, nr. 440 (1930) 8. Luzon.
34. *metroxylonis* Uhmann, Z. wiss. Ins. biol. 24 (1929) 144–, Abb. 2.
35. *montivaga* Maulik, Fauna Brit. India, Hispinæ (1919) 63–. Assam.
36. *mungphua* Maulik, *l.c.* (1919) 59–, Abb. 19. Sikkim.
37. *nagaja* Maulik, *l.c.* (1919) 62–. Assam.
38. *nigritarsata* Maulik, *l.c.* (1919) 46. Ceylon.
39. *nigrovittata* Gest., Ann. Mus. Stor. natr. Genova (3)7(47) (1917) 397–. Luzon.
40. *palawanica* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 19–. Palawan.
41. *philippinica* Uhmann, *l.c.* 5 (1931) 14. Mindanao.
42. *picitarsis* Uhmann, *l.c.* 5 (1931) 9. Luzon.
43. *pita* Maulik, Fauna Brit. India, Hispinæ (1919) 48. Ceylon.
44. *procedens* Uhmann, Ark. Zool. 30, nr. 26 (1939) 1–. Birma.
45. *puella* Gest., Ann. Mus. Stor. natr. Genova, (3)8(48) (1919) 338–. Borneo.
46. *puellaris* Pic, Échange 46, nr. 440 (1930) 8. Philippinen.

47. *raffaeli* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 12–. Mindanao. = *puellaris* Pic.
48. *roepkei* Uhmann, Z. wiss. Ins. biol. 24 (1929) 144, Abb. 1. Java.
49. *ruficeps* Pic, Bull. Soc. zool. France 54 (1929) 139. Tonkin.
50. *spaethi* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 11. Luzon.
51. *sundara* Maulik, Fauna Brit. India, Hispinæ (1919) 61. Birma.
52. *testaceipes* Pic, Mél. exot. ent. 42 (1924) 27. Birma.
53. *tibangana* Uhmann, Ark. Zool. 31, nr. 4 (1939) 2–, Abb. 1. Borneo.
54. *undulata* Uhmann, Fol. zool. hydrob. 5 (1933) 61, Abb. 1. Philippinen.
55. *vicina* Pic, Mél exot. ent. 49 (1927) 25. Tonkin. var. *latithorace* Pic, *l.c.* Tonkin.
56. *violaceicornis* Pic, Bull. Soc. ent. France 42 (1937) 109. Sud-Indien.
57. *elliptica* Gressit, Lingnan Sci. Jour. 18 (1939) 198, fig. China.

HISPODONTA Baly

1. *delkeskampi* n.sp. New Guinea.
2. *forticornis* Heller, Ent. Bl. 12 (1916) 115. Celebes.
3. *loriæ* Gest., Ann. Mus. Stor. natr. Genova, (3)6(46) (1913) 13. Brit. N.-Guinea.
4. *samarica* Uhmann, N. Beitr. syst. Ins. k. 5 (1931) 5–. Philippinen: Ins. Samar.
5. *unicolor* Heller, Ent. Bl. 12 (1916) 115–. Celebes.

PSEUDOCALLISPA Uhmann

N. Beitr. syst. Ins. k. 5 (1931) 6.

1. *schultzei* Uhmann, *l.c.*: 7 ff, Abb. 1. Philippinen: Dinagat Inseln.

AMBLISPA Baly

1. *lævigata* var. *viridis* Maulik, Fauna Brit. India, Hispinæ (1919) 73. Sud-Indien.
2. *lævigata* var. *purpurascens* Maulik, *l.c.* Ceylon: United Prov.

VERZEICHNIS MEINER HIER ERWAHNTEN BEITRÄGE

3. Ent. Bl. Berlin 23 (1927).
14. Z. wiss. Ins. biol. Berlin 24 (1929).
16. Misc. zool. Sumatra. Medan 43 (1930).
26. N. Beitr. syst. Ins. k. Berlin 5 (1931).
26b. N. Beitr. syst. Ins. k. Berlin 5 (1931).
26c. N. Beitr. syst. Ins. k. Berlin 5 (1931).
31. Misc. zool. Sumatra. Medan 54 (1931).
34. Zool. Meded., Leiden 14 (1931–32).
35. Mitt. zool. Mus. Berlin 17 (1931).
36. Mitt. Dtsch. Ent. Ges. Berlin 3 (1932).
40. Fol. zool. hydrob. Riga 5 (1933).
43. Contr. Ann. South Afri. Mus., Kapstadt 30 (1934).
53. Treubia, Buitenzorg 15 (1935).
74. Ark. Zool. Stockholm 30 A, Nr. 26 (1939).
78. Treubia, Buitenzorg 17 (1939).
80. Ark. Zool. Stockholm 31 B, Nr. 4 (1939).
90. Zool. Anz. Leipzig 130 (1940).
95. Explorat, Parc. nat. Albert; I. Mission Witte, Brussel 42 (1942).

99. Zool. Anz., Leipzig 141 (1943).
109. Additamenta faun. Coleopterorom, Hamburg 4 (1946) (48).

ABBILDUNGEN

Abb. 1. *Hispodonta delkeskampi* n. sp. Holotypus. Fühler von der Schmalseite Skutellarreihe-mit der 1. Punktreihe vereinigt. Der unregelmässige Verlauf der ersten vier Reihen angedeutet.

2. *Spilispa imperialis* Baly. Linker Vordertarsus mit der Asymmetrie der Fussglieder.

3. *Callispa flaveola* Uhmann. Holotypus. Linke Decke, den Verlauf der Punktreihen zeigend.

4. *Callispa procedens* Uhmann. Paratypoid. Die gestrichelte Binde bedeutet den Vorderrand des blauen Spitzenflecken auf den Decken. Rechts sind manche Reihenpunkte durch eine feine Linie verbunden, um den Verlauf einiger Punktreihen zu verdeutlichen.

5. *Callispa impressa* Uhmann. Paratypoid, Die Decken mit den Eindrücken.

FAUNA PHILIPPINENSIS, VIII

123. CONTRIBUTION TO THE MORPHOLOGY AND TAXONOMY OF THE SCOLYTOIDEA.

By Karl E. Schedl
Lienz, Austria

THREE TEXT FIGURES

Once again I am in a position to present some new facts on the bark-and ambrosia-beetles of the Philippines on the basis of material collected some time ago and now in the possession either of the Californian Academy of Science or in my own collection.

New records and Synonymy

CRYPHALUS MALLOTI Schedl

Cryphalus malloti Schedl, Ent. Bl. 39 (1943) 37 (Luzon).

Some additional specimens of the type series have been found in undetermined material of the late Forstrat Eggers. They contain references to the following foodplants:

Luzon: Manila, ex *Pinus insularis* Endl. (Coll. Schedl). Baguio, ex *Mallotus ricinoides* (Coll. Schedl).

CARPOSINUS PINI Hopkins

Carposinus (*Pelicerus*) *nitidus* Eggers.

Type specimens of *Carposinus* (*Pelicerus*) *nitidus* Eggers, Zol. Meded. Leyden 7 (1923) 216 (Luzon), again have been compared with cotypes of *Carposinus pini* Hopkins, U.S.D.A. Rept. 99 (1915) 47 (Baguio). They are identical, *Carposinus pini* Hopk. having priority. The generic synonymy has been stated elsewhere. Another cotype of the *Pelicerus nitidus* Eggers now on hand does bear a host label saying "*Pinus insularis*" the same foodplant stated by Hopkins for his species.

CARPOSINUS (PELICERUS) BREVIOR Eggers

Carposinus (*Pelicerus*) *brevior* Eggers, Philip. Jour. Sci. 33 (1927) 86 (Philippinen).

Mindoro: Subaan, January 25, 1916, Böttcher.

Luzon: Imugan, October 30, 1917, Böttcher.

Three specimens in my collection bear labels from Eggers "*Oriosiotes mindoroensis* n. sp., Type," but they clearly are identical with *Carposinus brevior* Eggers. A description of the manuscript name has not been published.

COPTOSOMUS nom. nov.

Coptodryas Schedl, nec. Hopkins

I described a new genus *Coptodryas* in Rev. Brasil. Biol. 9 (1949) 262, in which I overlooked Hopkins, U.S.D.A., Rept.

99 (1915) 54, genus of the same name from the Philippines. Therefore, I am changing my *Coptodryas* into *Coptosomus*.

XYLEBORUS SCHULTZEI Schedl

In press. (Luzon).

LUZON: Manila, ex *Gliricidia sepium* Steud., W. Schultze (Coll. Schedl).

P. I., Dapa, 1916, leg. Böttcher (Coll. Schedl).

P. I., Kolambugan, 1919, leg. Böttcher (Coll. Schedl).

XYLEBORUS PUNCTULATUS Schedl

In press. (Luzon).

A second specimen bearing a label from Eggers, "*Xyleborus nitidus* n. sp., Type" has been found in the remaining Eggers collection. Another label refers to the host as "*Mallotus ricinoides* M." This specimen has been misidentified by Eggers and probably there do exist additional specimens with such labels. In reality the specimens bearing these labels from Eggers belong to two different species, the one mentioned above to *Xyleborus punctulatus* Schedl, the others to *Xyleborus nitidus* Schedl, the description of which is in press.

Xyleborus nitidus Hag. mentioned by me in Ann. Mag. Nat. Hist. 3 (1950) 894 never has been described and the specimens in the British Museum are synonymous with *Xyleborus testaceus* Walker.

XYLEBORUS MANCUS Blandford

Xyleborus mancus BLANDFORD, Trans. Ent. Soc. London (1898) 428 (Ceylon).

LUZON: Manila, ex *Anacardium occidentale* L., W. Schultze (Coll. Schedl).

Manila, ex *Bixa orellana* L., W. Schultze (Coll. Schedl).

XYLEBORUS EXIGUUS Walker

Xyleborus exiguus WALKER, Ann. Mag. Nat. Hist. 3 (1857) 260 (Ceylon, Andamanen, Birma).

LUZON: Manila, ex *Citrus maxima* Burm, W. Schultze (Coll. Schedl).

Manila, ex *Anacardium occidentale* L., W. Schultze (Coll. Schedl).

XYLEBORUS TESTACEUS Walker

Xyleborus testaceus WALKER, Ann. Mag. Nat. Hist. 3 (1859) 260 (Ceylon).

LUZON: Manila, ex *Gliricidia sepium* Steud., W. Schultze (Coll. Schedl).

Manila, ex *Citrus maxima* Burm., W. Schultze (Coll. Schedl).

Manila, ex *Pithecolobium dulce* Benth., W. Schultze (Coll. Schedl).

SCOLYTOPLATYPUS LUZONICUS Eggers

Scolytoplatypus luzonicus EGGERS, Ent. Bl. 31 (1935) 244 (Luzon).

The original description does not contain any reference to foodplant although most of the type specimens bear host labels. Such foodplants of the specimens in my collection are:

Ficus benguetensis M.
Ficus sp.
Mallotus ricinoides M.

SCOLYTOPLATYPUS PUSILLUS Eggers

Scolytoplatypus pusillus EGGERS, Ent. Bl. 31 (1935) 243 (Luzon).

LUZON: Manila, ex *Mallotus ricinoides* M., W. Schultze.
Baguio, ex *Ficus benguetensis* M., W. Schultze.
Benguet, Irisan, ex *Pinus insularis* Endl. W. Schultze.

All specimens from the type series at present are in my collection.

CROSSOTARSUS LECONTEI Chapuis

Crossotarsus lecontei CHAPUIS, Monogr. d. Platyp. (1865) 60 (Philippinen).

LUZON: Mt. Maquiling, ex *Diplodiscus paniculatus,* April 11, 1931, F. C. Hadden (Cal. Acad. Sci.).

CROSSOTARSUS CINCINNATUS Chapuis

Crossotarsus cincinnatus CHAPUIS, Monogr. d. Platyp. (1865) 57 (Borneo, Sumatra).

MINDANAO: Zamboanga, Kabasalan, February 4, 1932, H. C. Muzzall (Cal. Acad. Sci.).

CROSSOTARSUS MNISZECHI Chapuis

Crossotarsus mniszechi CHAPUIS, Monogr. d. Platyp. (1865) 62 (New Guinea, Celebes, Aru Isl. Key Isl., Australia).

LUZON: Mt. Maquiling, August 16, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS JANSONI Chapuis

Platypus jansoni CHAPUIS, Monogr. d. Platyp. (1865) 244 (New Guinea, Moluccen, Celebes).

MINDANAO: Zamboanga, Kabasalan, May 4, 1932, H. C. Muzzall (Cal. Acad. Sci.).

PLATYPUS TURBATUS Chapuis

Platypus turbatus CHAPUIS, Monogr. d. Platyp. (1865) 242 (Philippinen).

LUZON: Mt. Maquiling, 5,000 ft., April 1, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS CURTUS Chapuis

Platypus curtus CHAPUIS, Monogr. d. Platyp. (1865) 261 (Malacca, Borneo).

LUZON: Mt. Maquiling, February 16, 1931, F. C. Hadden (Cal. Acad. Sci.).

MINDANAO: Zamboanga, Kabasalan, February 19, 1932, F. C. Hadden (Cal. Acad. Sci.).

MINDANAO: Zamboanga, Basilan, October 15, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS CALICULUS Chapuis

Platypus caliculus CHAPUIS, Monogr. d. Platyp. (1865) 280 (Siam, Tonkin, Yunnan, Sumatra).

LUZON: Mt. Maquiling, ex anonang, *Cordia dichotoma,* H. C. Muzzall (Cal. Acad. Sci.).

MINDORO: San José, April 5, 1945, E. S. Ross (Cal. Acad. Sci.).

PLATYPUS CUPULATUS Chapuis

Platypus cupulatus CHAPUIS, Monogr. d. Platyp. (1865) 278 (Borneo, Java, Sumatra, Nilgeri, Hills, Malacca, Andamanen).

LUZON: Mt. Maquiling, April 1, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS LEPIDUS Chapuis

Platypus lepidus CHAPUIS, Monogr. d. Platyp. (1865) 282 (Celebes, Molukken, Philippinen, Java, Engano).

MINDANAO: Zamboanga, Kabasalan, February 14, 1932, H. C. Muzzall (Cal. Acad. Sci.).

PLATYPUS (CROSSOTARSUS) FRACTUS Sampson

Platypus (*Crossotarsus*) *fractus* SAMPSON, Ann. Mag. Nat. Hist. 10 (1912) 249 (Sarawak).

LUZON: Tayabas, Dolores, May 16, 1930, Van Dyke (Cal. Acad. Sci.).

Basilan: October 15, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS (CROSSOTARSUS) COLEOPTRATUS Schedl

Platypus (*Crossotarsus*) *coleoptratus* SCHEDL, Philip. Jour. Sci. 56 (1935) 400 (Philippinen).

LUZON: Mt. Maquiling, April 1, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS (CROSSOTARSUS BIFURCUS Schedl

Platypus (*Crossotarsus*) *bifurcus* SCHEDL, Philip. Jour. Sci. 67 (1938) 422 (Mindanao).

LUZON: Tayabas, Dolores, May 16, 1930, Van Dyke (Cal. Acad. Sci.).

Basilan: October 15, 1932, F. C. Hadden (Cal. Acad. Sci.).

PLATYPUS PHILIPPINENSIS Blandford

Platypus philippinensis BLANDFORD, Trans. Ent. Soc. London (1896) 193 (Philippinen).

LUZON: Mt. Maquiling, November 1, 1932, F. C. Hadden (Cal. Acad. Sci.).

Description of New Species

CRYPHALUS BREVISETOSUS Schedl masc. nov.

The original description of *Cryphalus brevisetosus* [Ent. Bl. 39 (1943) 36] does refer to the female. The male has the front more convex, with a fine and long transverse carina above. The pronotum is more triangular in outline, sides subparallel on the basal third only, the sides strongly and very obliquely convergent toward the narrowly rounded apex, the summit further behind, the anterior area very obliquely convex, the fine and numerous asperities extending to nearly the base. Elytra not distinctly different from that of the female.

Types in Schedl collection.

Localities.—Luzon, Baguio, W. Schultze; Benguet, Irisan, same collector.

XYLEBORUS ADOSSUARIUS n. sp.

Female.—Fusco-ferruginous, 2.4 mm long, 2.18 times as long as wide. Closely allied to *Xyleborus dossuarius* Eggers, but larger, the elytral disc longer, the declivity shorter and without the fine pubescence on the latter.

Front moderately convex, minutely punctulate, finely punctured, with a few moderate long hairs below.

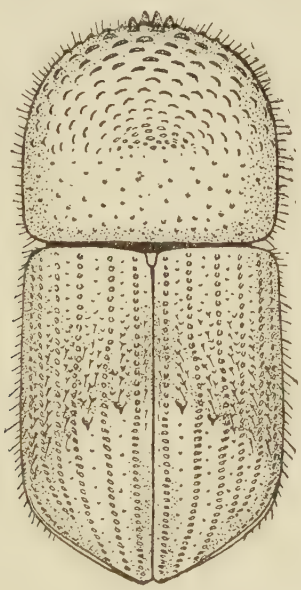

FIG. 1. *Xyleborus adossuarius* n. sp., female.

Pronotum strongly globose, wider than long (33 : 26), postero-lateral angles but feebly rounded and rectangular, sides nearly straight on basal fourth, thence gradually incurved to broadly rounded apex, the latter feebly extended downwards in middle and armed with four asperities, the median two of which being distinctly longer; summit high, short behind middle, anterior area steeply convex and densely asperate, basal area shining, minutely punctulate, very finely and rather densely punctured; pubescence very fine, short and inconspicuous. Scutellum large, triangular, shining.

Elytra as wide and 1.77 times as long as pronotum, sides parallel to somewhat beyond middle, apex angulately rounded, declivity commencing shortly behind middle, very obliquely convex; disc shining and ascending in basal third, very densely granulate-punctate and slightly depressed behind, striate, punctate, punctures small, striæ not very distinct, especially on granulate part of disc, interstices in basal portion each with a row of similar punctures, which change into granules behind, second and third with a small short pointed spine at commencement of declivity; declivital face subshining, raised towards suture behind, strial punctures distinctly larger, striæ impressed, interstices each with a row of minute granules, first interstice very narrow above somewhat wider below, second and third interstices wide just behind spines, becoming subequal to others below, fourth and fifth striæ joining each other on declivital face; pubescence very inconspicuous all over.

Types in the Schedl collection.

Locality.—Luzon: Baguio, W. Schultze; Benguet-Irisan, same collector.

The four specimens before me came from late Forstrat Eggers, who had named them as *Xyleborus adossuarius* n. sp., but has not published a description.

XYLEBORUS BICORNIOIDES n. sp.

Female.—Piceous, 3.0 mm long, 22.2 times as long as wide. To be placed between *Xyleborus bicornis* Eggers and *X. protensus* Eggers, being different from the former by its size, the more stout pronotum, the more deeply excavate declivity etc.

Front short, fairly shining, densely granulate-punctate, with indications of a median longitudinal carina.

Pronotum about as long as wide (39 : 40), widest just behind middle, postero-lateral angles but feebly rounded and closely attached to elytra, sides feebly arcuate to somewhat beyond middle, apex broadly rounded when viewed from above, apical

margin narrowly extended downwards when seen from in front and armed with four narrowly placed asperities, the two median of which being much longer; summit high and in middle, anterior area densely and rather finely asperate, basal area polished and shining, with fairly fine but deep punctures as though pricked with a needle; pubescence sparse but very long. Scutellum comparatively small, shining, about as long as wide.

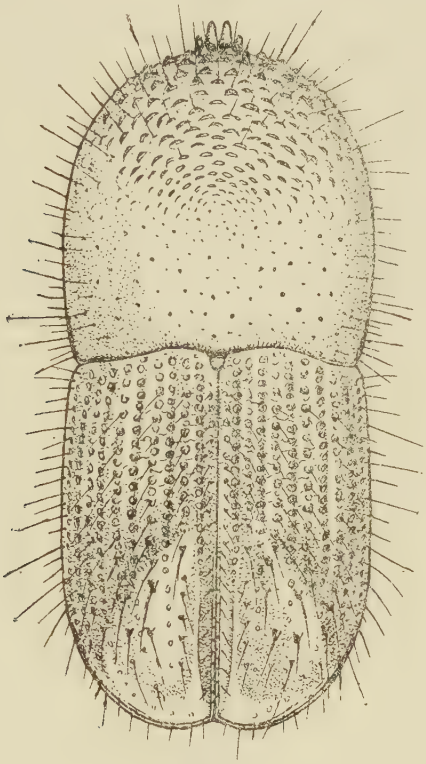

FIG. 2. *Xyleborus bicornioides* n. sp., female.

Elytra as wide and 1.28 times as long as pronotum, sides feebly arcuate, subparallel in basal third, thence very gradually incurved to broadly rounded apex, each elytron somewhat separately rounded near suture, declivity commencing shortly before middle, broadly impressed, apical margin acute up to seventh interstice; disc with moderately large but very deep punctures in hardly impressed rows, interstices uniseriately punctured, the punctures of equal size to that of striæ and

somewhat confused behind, entire surface therefore roughly sculptured; declivity with suture feebly elevated and impunctate along greater part, space of first striæ impressed but punctures themselves obscure, second interspace depressed, more so in median third of declivital face, third and fourth interstices forming low lateral convexities and each with a row of fine setose granules, more such granules on sides, some larger tubercles on third and fourth interstices more irregularly placed, two to three on third interstice, one or two on fourth; pubescence very long throughout, but not very densely placed.

Type in Schedl collection.

Locality.—Mindanao, Lolumbugan, January 23, 1915, leg. Böttcher.

XYLEBORUS PULLUS n. sp.

Female.—Reddish brown, 1.6 mm long, 2.5 times as long as wide. More closely allied with *Xyleborus nudibrevis* Schedl, but much larger, feebly stouter, basal area of pronotum with punctures finer and granules of elytral declivity not extending to disc.

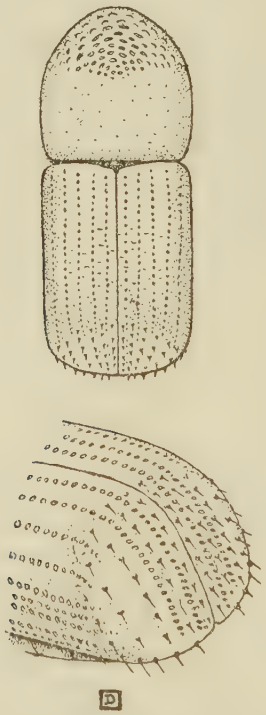

FIG. 3. *Xyleborus pullus* n. sp., female.

Front, comparatively wide, very feebly convex, with some fine punctures.

Pronotum as wide as long, appearing to be more slender on account of peculiar outline, postero-lateral angles feebly rounded, sides very feebly arcuate, subparallel on not quite the basal half, thence obliquely incurved to rather narrowly rounded apex, a subapical constriction hardly noticeable; summit shortly before middle, anterior area obliquely convex and densely asperate, basal area shining and with some fine punctures which can be seen on very careful inspection only; subglabrous. Scutellum small, shining.

Elytra but feebly wider and 1.6 times as long as pronotum, sides parallel on basal two-thirds, apex broadly rounded, declivity very short, steeply convex; disc with subregular rows of shallow and in part indistinct punctures, interstices impunctate but with some fine wrinkles here and there; declivity with punctures of striæ to be seen under a certain illumination only, interstices with fine setose granules.

Type in Schedl collection.

Locality.—Philippines, Calapan, June 10, 1916, Böttcher leg.

The only specimen from the Eggers collection was named as *Adryocœtes nitidus* Eggers *in literis*, but I can see no reason why it should not be included in the genus *Xyleborus*.

BOOKS

Introduction to the study of aircraft vibration and flutter. By Robert H. Scanlan and Robert Rosenbaum. New York, The MacMillan Company, 1951. 428 p. Price $7.50.

Vibration and aeroelasticity has always been a fascinating subject in aircraft structural design and stability research since it involves a deep knowledge of mathematics, a good background in aerodynamics and physics, and most important of all common sense.

This book is up-to-date in its treatment of the subject of vibration analysis and its relation to modern airplane design and would be useful to advance students and aeronautical engineers interested in the study.

The first chapters of basic mathematical materials are intended to acquaint the engineer with basic analytical methods used in the discussions. The authors then proceed to explain analytical theories underlying general motions specially ocillatory motions by the use of Lagrange's equations of motion. A study of the single-and two-degree-of-freedom systems offer many instructive examples in vibration studies. A discusison of the class of oscillations characterized as self-excited and its association with airplane wing flutter is analysed mathematically on the basis of the potential flow theory.

Oscillatory motions in aircraft structural parts such as the fuselage, wings, tail surfaces, landing gears, etc., are studied in the light of the beam theory. Several approximate methods for calculating frequencies and modes of these elastic beam systems under bending and torsion are considered. Among the methods discussed are the following: Rayleighs energy, Rayleigh-Ritz, Stodola, Holzer, Myklestad and the influence coefficients employing matrix methods. These methods are elaborated by appropriate tables to aid the student in working out rapid evaluation of bending and torsional frequencies of uniform or non-uniform beams.

Wing and tail flutter analysis is associated with the two-dimensional potential flow theory. Flutter considerations here are however, based on the assumption that the potential flow is incomparable, that the wing is of infinite aspect ratio, so that variation of airfoil mass, elastic and geometric parameters

are neglected. Since critical flutter speed is a function of the natural frequency of the system, the study of the amplitude of oscillation of flutter by the two-dimensional flutter theory is now always satisfactory, due to the basic limitations, hence a more detailed approach of the problem by the three-dimensional flutter theory is made, wherein these shortcomings are satisfied by considering dynamic and aerodynamic factors with the effects of compressibility in the flow. This analyses leads us to the importance of static mass balance of control surfaces and the spanwise distribution of mass balance.

Important cases of empennage flutter conditions are also treated. Where bending, torsion, and control surface motion are not independent, but are locked in phase relationship and magnitude, a more accurate flutter analysis based on the superposition of a finite number of these modes is considered by using normal (coupled) modes. These modes can be obtained by direct calculation or from ground vibration tests.

Several methods for the solution of the flutter stability determinant are given with the help of tabular forms showing actual solutions that could be practical and effective. The principles employed in the determination of frequencies and modes by matrix iteration method are applied in the analysis of such aeroelastic problems as wing torsional divergence, aileron reversal and effectiveness which are treated as stability problems. Empirical methods for the prevention of reversal and divergence are given.

The necessary instrumentation and ground vibration test procedures are used as a physical check of the flutter parameters applied in design are also discussed.

A final chapter is given on modern swept-back wing design which offers many new structural and aerodynamic problems. Vibration and flutter analysis of a sweptback wing are however, given only on the usual assumption that the flow is incompressible.

The book gives a list of all the principal scientific aviation research organizations and principal aviation publications. There is an elaborate bibliography of all important scientific publications and reports related to the subject of vibration and flutter as discussed in the text that should give the student enough reference material for further studies.

An appendix leads the student to a discussion of a general equation governing subsonic and supersonic flows and their relation to flutter problems. Sample tables are given on super-

sonic flutter lift and moments and also of the aerodynamic coefficients for use in three-dimensional flutter analysis of tapered airfoils.

Although the topic on the dynamics of aircraft power plant is omitted and discussion on model testing, test instrumentation and unsteady compressible flow theory are rather limited, the subject matter of aeroelasticity in general is classically and effectively presented.

This book is essentially a text of importance to the advance student interested in current aviation engineering practices in the field of aeroelasticity.—A. J. de L.

Milk and milk products. By Clarence Henry Eckles, Willes Barnes Combs and Harold Macy. Fourth Edition. New York, McGraw-Hill Book Company, Inc., 1951. 454 p. illus.

This book is excellent for an introductory course in dairying. It presents the fundamentals of dairy science as well as the technical aspects of dairy products manufacture on a college level.

It deals intensively on composition of milk, its physical and chemical properties and the factors that affect its characteristics.

Other valuable topics such as the microbiology of milk and milk products and the nutritive value of dairy products are included.

For those who are interested in dairying operations, this book covers useful topics such as common dairy processes, the sanitary production of milk, the manufacture of dairy products, miscellaneous tests and analytical procedures used in the detection and standardization of quality and practical preservation of dairy arithmetic.—S. R. P.

Fluid mechanics. By Victor L. Streter. First Edition. New York, McGraw-Hill Book Company, Inc., 1951. 366 p. Illus, price $5.00.

The student handling this text should have completed integral calculus and at least two courses in engineering mechanics. This book continues student's training in analytical expression. Higher level treatment is given to old subjects in order to encourage analytical maturity but elementary level treatment is used to introduce and develop new concepts. General order of presentation follows the traditional pattern. Treatment of problems is novel and these are presented as a gauge for amount of assimilation by students. These make excellent objective tests and are graduated in difficulty—varying from the simplest to the more difficult. Materials in the book may be chosen in line

with the interest of student groups. Instructors will find this book as useful as it is to the student.

The author is a research professor in mechanics, Director of Fundamental Fluid Research, Illinois Institute of Technology.—M. F.

A textbook of biochemistry. By Philip H. Mitchell. Second Edition. New York, McGraw-Hill Book Company, Inc., 1950. 695 p. illus.

This book presents to the student in biochemistry a summary of the latest developments in its various fields. Necessarily of limited size, many new data have been compressed within its pages and would offer stimulating reading not only to students but also to those interested in a refresher study of the subject. Many concepts have been reviewed, revised and sometimes changed in the light of latter development in this field. The book presents a clearer concept of the chemistry of life.—F. M. Y.

The toxicology of uranium. By Albert Tannenbaum. First Edition. New York, McGraw-Hill Book Company, Inc., 1951. 333 p. illus. Price $3.00.

This book is a collection of papers by various investigators on the toxicology of uranium under the supervision of the Manhattan Project of the U. S. Atomic Energy Commission. The work was started in an effort to gather information regarding the toxic effects of uranium on atomic bomb workers. The reports presented are a result of very rapid fact finding work under war pressure and hence are not as complete as those of classical researches. However, they would make very interesting reading for those who, some day, expect to work on problems regarding uranium and its activities.—F. M. Y.

Advanced organic chemistry. By G. W. Wheland. Second Edition. New York, John Wiley and Sons, 1949. 799 p. Price $8.00.

The book is intended as a text for advanced organic students. It presents the subject, not as mere conglomeration of isolated facts, but it attempts to correlate the various relationships existing among the innumerable organic phenomena. The book presents the structural theory in its broadest aspect, and they are thoroughly discussed in the various chapters. The structural theory pervades the whole of organic chemistry hence the emphasis given to it in this text.—F. M. Y.

Principles of phase equilibria. By F. E. W. Whetmore and D. J. Le Roy. First Edition. McGraw-Hill Book Company, Inc., New York, 1951. 200 p. $3.50.

This book deals with the phase rule and is the result of the authors experience in presenting to graduate and undergraduate students in arts, science and engineering the principles of heterogeneous equilibria in terms of laboratory criteria and from a fundamental point of view, without recourse to formal thermodynamics.

The desirability of combining the practical with the theoretical approach has been met by devoting a considerable portion of the text to such practical matters as the quantitative description of systems in equilibrium and the treatment of distillation and courses of crystallization. Systems of one, two, three and four components are discussed.

The advance student will appreciate that many of the proofs given in the text can be derived from thermodynamics.

Exercises are included at the end of each chapter.—E. P. R.

Atomic physics. By Wolfgang Finkelnburg. First edition. McGraw-Hill Book Company, Inc., New York, 1950. 498 p. illus. $6.50.

This book is a translation from the revised German edition entitled "Einfuhrung in die Atomphysik" and is supposed to contain all available published material up to the spring of 1949.

The author's purpose in this book is to give a pictorial description of the entire atomic field, which as we know is very much alive and in an active state. The book starts with the significance of atomic physics in science and its practical applications, touching on the methods of research and difficulties and methods of presentation. This is followed by discussions on atoms, ions, electrons, atomic nuclei and photons. Atomic spectra and atomic structure cover the next part of the book followed by a discussion of the atomic theory according to quantum mechanics. This book of Finkelnburg differs from most books on the same subject by devoting several pages to molecular physics.

Science will find this book appropriate for a good survey course in atomic physics. There is a list of references at the end of each chapter. The format is good and is replete with numerous illustrations.—E. P. R.

Principles and practice of spectrochemical analysis. By Norman H. Nachtrieb. First edition. McGraw-Hill Book Company, Inc., New York, 1950. 324 p. illus.

As suggested by the title, this book deals with the theory and standard technique in spectrochemical analysis. It is

divided into two parts, the first of which deals with the theory and use of the instruments of emission spectroscopy and with the theory of analytical spectroscopy. The second part is concerned with the applications of spectrographic methods of analysis to solutions, metals and non-conducting solids. In the second part, the case for a wider use of chemical-separation technique is presented and the roles of electrolysis, solvent contraction, organic complexing reagents, carrier precipitations and the manipulative operations of trace analysis are discussed in relation to spectroscopy.

This text should serve as a good working reference book for technical men who are engaged in contemplating to use spectrochemical methods in the analytical laboratory.— E. P. R.

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